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ABSTRACT

Intended to assist the producer in meeting the housing regulations of Federal, state, and local governments for migratory workers and thereby to attract better labor through adequate housing, this agricultural handbook contains discussions of the migrant-labor situation; regulations and standards; general housing considerations (i.e., length of occupancy, farm-based or central camps, rental charges, constraints to housing improvements); specific housing considerations (i.e., housing site, water supply, excreta and liquid-waste disposal, essentials for good housing, housing space and arrangements [space, separate sleeping facilities, individual family units, sleeping and central-facilities combination, a motel-type housing unit, and trailers]); choice of materials and construction methods in terms of floors, floor coverings, walls and partitions, roofs, roofing, painting; lighting; ventilation and screening; heating; toilet facilities (flush toilets, septic privies, chemical toilets, pit-type privies [traditional type]); facilities for bathing, laundering, and hand washing; cooking and eating facilities (individual units, communal cooking and eating, and central mess facilities); garbage and other refuse disposal; insect and rodent control; fire, safety, and first aid; health units and sanitation; child-care centers; recreation; landscaping, camp layout and roads; management; financing; and investment and operation costs. Included are 5 tables and 50 figures. (MJB)

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HOUSING
for Migrant Agricultural Workers

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Agricultural Research Service
UNITED STATES DEPARTMENT OF AGRICULTURE

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PREFACE

This publication was developed under a Memorandum of Agreement between The Migrant Health Branch, Division of Community Health Service, Public Health Service, U.S. Department of Health, Education, and Welfare, and Livestock Engineering and Farm Structures Research Branch, Agricultural Engineering Research Division, Agricultural Research Service, U.S. Department of Agriculture. The project was initiated under the leadership of Robert W. Jones, III, Sanitary Engineer, Consultant, Migrant Health Branch, and Robert G. Yeck, Chief, Livestock Engineering and Farm Structures Research Branch.

The authors express their appreciation to State and local health officials, State and local labor officials, and State and county agricultural extension specialists who arranged labor camp visits and aided in the identification of problems. Crop producers and camp operators were also very cooperative and helpful in identifying problems—particularly constraints to improvements.

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HOUSING FOR MIGRANT AGRICULTURAL WORKERS

By J. W. SIMONS, *leader, Rural Housing Investigations*, W. R. PARKER, *architect (project leader at Beltsville)*, J. O. NEWMAN, *research agricultural engineer*, PEGGY TASKER, *architect*, B. C. HAYNES, JR., *research agricultural engineer*, and R. H. RULE, *architect, Agricultural Engineering Research Division, Agricultural Research Service*

Good housing contributes much to the health and well-being of migrant agricultural workers and their families and is important in maintaining community health. It has a beneficial effect on efficiency of the workers and is one requirement for a stable labor force. An employer who offers good housing has a greater chance of attracting better workers who stay as long as they are needed and return another year.

INTRODUCTION

The housing of migrant, or seasonal, agricultural workers is of national concern. Adequate production of food and fiber is essential to our general economy. The seasonal nature of most crops creates peak labor demands. These demands are generally not of sufficient duration to be met by local laborers who would need other income to supplement the short burst of income provided by seasonal work. However, employment can be provided during a major part of the year to workers who are willing to move with the seasonal demands of crops.

The advantage to the rural community is the continuation of an agricultural industry that is made possible by the availability of a migrant work force. However, when migrant workers are improperly housed, managed, and cared for, the entire community suffers. The health and welfare of the individual worker is, of course, of great importance, but, because of the interaction of the worker and the welfare of the Nation, these needs become of interest to all. Similarly, the producer of agricultural products is greatly concerned. The results of his labor and investment are not realized unless a crop is harvested. Without this harvest, the economy of the community falters; the community is adversely affected. Therefore, good housing for the migrant worker is a necessity.

In general, the producer has been expected to pay the cost of housing. It is then a part of the cost of production and is reflected in the price the consumer must pay. This leads to the need for economy in design both to protect consumer interests and to protect an industry.

This national concern has led to the establishment of advisory services and regulations by various agencies of Federal, State, and local governments. This handbook is intended to assist producers in meeting such regulations and in attracting labor through adequate housing.

MIGRANT-LABOR SITUATION

An estimated 750,000 to 1,000,000 domestic farm workers and family members now migrate each season. This mobile labor force requires approximately 2.5 million bed spaces.

A large number of families with children are now involved in seasonal work; thus, the

number of persons traveling is large in proportion to the number of active workers. In the past many migrants were single males using dormitory-type facilities. These dormitories are not suited for families. In addition, there is a continuing need for new and remodeled housing to meet new Federal and State regulations.

REGULATIONS AND STANDARDS

New regulations pertaining to housing agricultural workers have been developed by a committee composed of representatives from the U.S. Department of Agriculture, the U.S. Department of Labor, and the U.S. Department of Health, Education, and Welfare (HEW). These regulations became effective October 31, 1968. Requirements established by the committee were based on standards resulting from research by the Department of Agriculture and on experience of the Department of Labor and the Public Health Service, HEW.

The Farm Labor and Rural Manpower Services, Manpower Administration of the U.S. Department of Labor has established facilities to assist agricultural employers in recruiting workers from places outside the State of intended employment. To qualify for these services an employer must be able to show that housing and facilities (1) are available; (2) are hygienic and adequate to the climatic conditions of the area of employment; (3) are large enough to accommodate the agricultural workers sought; and (4) will not endanger the lives, health, or safety of workers and their families. These requirements are ascertained by the State agency affiliated with the U.S. Farm Labor and Rural Manpower Services that receives the order for interstate recruitment. The housing and facilities must comply (1) with an applicable State or local law or regulation concerning safety, health, or sanitation, or (2) with the minimum standards set forth in Part 620—Housing for Agricultural Workers—of the Code of Federal Regulations,[1] whichever is more stringent.

The use of the Farm Labor and Rural Manpower Services will also be denied when there exists an unsanitary or hazardous condition not covered by applicable State or local law or the standards contained in Part 620 or where past failures to provide safe and sanitary housing indicate that the employer cannot be relied upon to comply with this Part.

In establishing the regulations, short-term or temporary occupancy was considered. The standards set forth in Part 620 are minimum standards and are not intended to discourage higher standards by State and local regulatory agencies, employers, associations, or camp owners.

Usually Federal regulations are adequate to meet most State and local codes. However, any grower, association, or camp owner planning to build or renovate existing structures should check with local and State agencies to determine all conditions that must be met in any particular locality.

GENERAL CONSIDERATIONS

Length of occupancy

Some migrant-labor housing is occupied only a few weeks each year. No distinction in the space requirement is made between short- and long-term housing by the U.S. Department of Labor regulations. However, short-term housing, for use in summer only, permits usage of light-frame construction, less permanent materials, or inexpensive masonry construction. Portable housing that can be moved about on skids without special equipment and the use of mobile homes may also be considered. In

[1] The regulations discussed in this publication may not be complete for all situations. Refer to the latest Federal, State, and local regulations that are applicable to your area. Federal regulations are available from the Farm Labor and Rural Manpower Service, Manpower Administration, U.S. Department of Labor, Washington, D.C. 20210.

cold climates early- or late-season housing may require insulation and heat.

Rental during off-harvest seasons to persons other than migrant workers could help distribute the cost. Before beginning construction, prospective owners of camps should investigate the possibilities of rental to hunters, fishermen, skiers, or other occasional users. In many cases a significant profit may be realized by such off-season rental.

All housing camps must include toilets or sanitary privies and hand washing and shower facilities, but running water within the housing units themselves may not be feasible for short-term occupancy.

Farm-based or central camps

Farm-based camps provide growers more assurance of getting skilled help when needed for picking crops. Many migrants prefer farm-based camps, too, as they save travel time to work and generally have less travel and rent costs. In some instances, workers return to work for the same grower year after year. Such workers are dependable and tend to take good care of housing facilities. Small farm-based camps are generally more orderly.

The investment required is the biggest disadvantage of farm-based camps. Where occupancy is limited to short periods each year, the cost per worker day is high.

Central camps usually provide workers for a number of growers. If these growers produce a large variety of crops, the production and harvesting season may extend over a relatively long period. Thus, the annual cost may spread over a greater number of days. Central camps simplify inspection as there are fewer camps to inspect. Sanitation may be controlled better, and it is easier to assist larger numbers of migrants through child care, health service, and educational programs.

Rental charges

Both the migrant and the grower are accustomed to the tradition of gratuitous housing; however, better housing and higher costs will very likely necessitate rental fees. With rental fees the grower can build to meet the new housing regulations and improve the quality of housing and the accommodations furnished.

Families often prefer to pay rent to give them a greater degree of independence and greater freedom in choosing their work. There is some indication that the general environment for living is better in camps where there is a rental fee. Rental rates vary even in nonprofit association camps. A study made in 1969 showed that families of four to six persons can expect to pay $10 or less per week for a divided one-room sleeping unit and central bath and toilet facilities.

Constraints to improvements in housing

Construction costs are a major constraint to extensive housing improvements. Large capital investments are often required. In addition, many growers are concerned about the effect of mechanization and the future need for migrant workers. These circumstances may justify the construction of only minimum facilities with a useful life of 5 to 10 years. The amount of housing required and the investment may be held to a minimum where crops are diversified and harvesting carefully planned to minimize the number of laborers. Large acreages of food products that ripen over a very short period require large numbers of laborers and the amount of housing required may be so great as to make it uneconomical for the grower to provide all the housing needed. A grower may provide some housing on his farm and obtain additional labor from central camps or from rented quarters in towns nearby.

SPECIFIC CONSIDERATIONS

Housing site

High, well-drained ground is essential to prevent the accumulation of standing water, which would induce breeding of insects and create an unsightly muddy area.

The site should be near a source of good water and sewage-disposal facilities or so located as to permit installing a good well and a proper sewage disposal system that will not create a nuisance or a hazard to health. The housing site should not be subject to offensive

odors, flies, noise, and traffic. Grounds within the housing site must be free from debris, noxious plants such as poison-ivy, and uncontrolled weeds or brush.

When selecting the site, allow not only for the space required at present for buildings, roads, sewage disposal, and recreation areas but also for possible later additions. The site must be large enough to space buildings properly; this minimizes possible fire hazards.

If possible the site should be within a reasonable distance of one or more main highways, not necessarily on the main road but close enough so the migrant can find it and have good access to other working areas.

Water supply

An abundant supply of safe water is needed. The water system must meet State requirements and be approved by the local public health department where applicable. If State or local codes are not in force, the system should meet requirements of the Federal regulations.

Both hot and cold water under pressure is desirable for bathing, laundering, and central-cooking facilities. In some States hot water is required and must be available at all times. A study in Oregon[2] indicated that a good water supply, good showers, and plenty of hot water under pressure ranked high when migrants who had a choice decided where to work.

The Federal regulations require a cold water tap within 100 feet of each individual living unit, when water is not provided inside the unit. Adequate drainage facilities for overflow and spillage are necessary, and a sign should be posted nearby to discourage dishwashing at the tap. Common-use drinking cups are not permitted. An economical, well-drained outdoor tap is shown in figure 1.

Migrant-labor camps have a much higher peak demand for water than ordinary residential or farm homes. Workers generally return from the fields in the evening at about the same time, and most of them desire showers with minimum delay. Many of the flush toilets are in use during the time showers are being taken by others. The following table will serve as a guide in determining the rate of usage for these two fixtures:

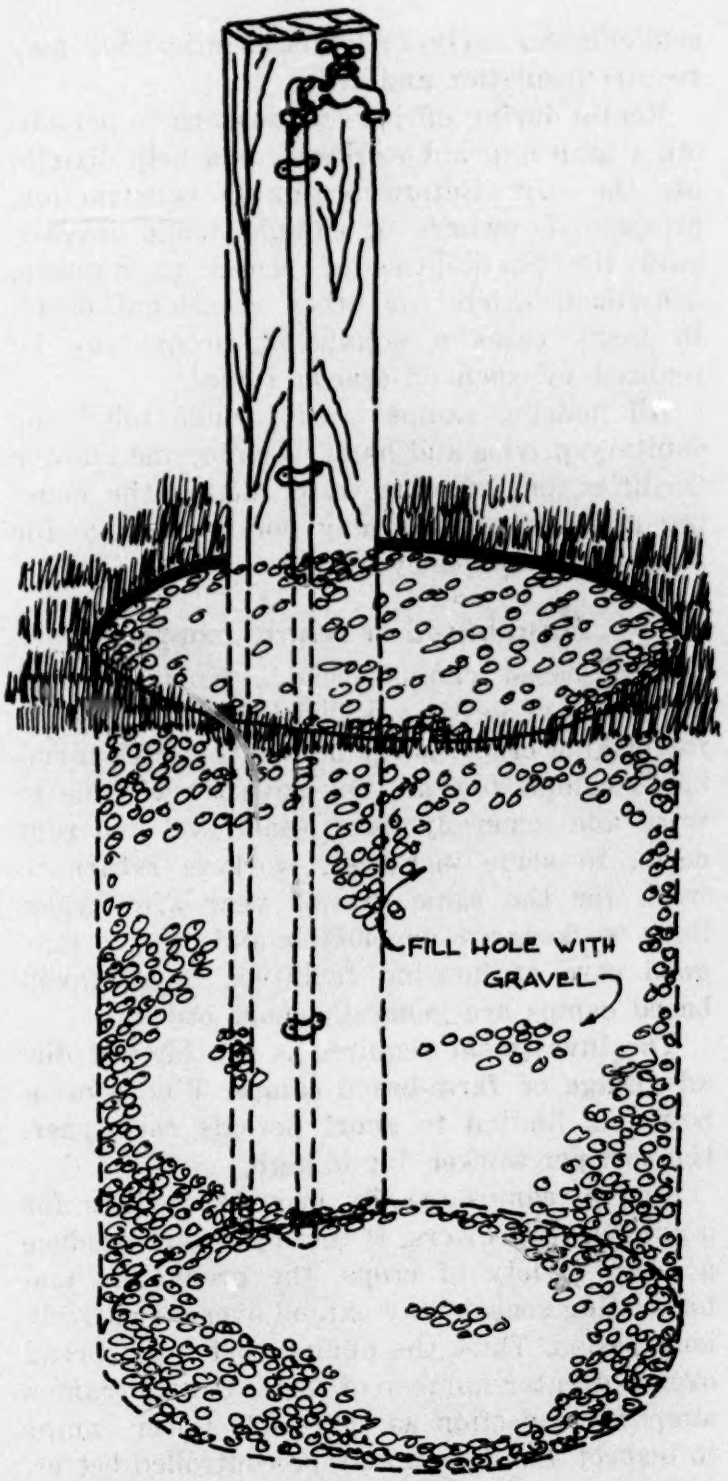


FIGURE 1.—Outdoor water tap installed within a 55-gallon drum (with bottom removed) filled with gravel for good drainage.

[2] CONKLIN, M. J., and MCELROY, R. C. A SURVEY OF MIGRANT FARMWORKER HOUSING IN OREGON. Oreg. Agr. Expt. Sta. Bul. 602, 39 pp. 1966.

	Gal. per minute	*Gal. for each use*
Each shower	5	15–25
Each flush toilet	3	4–7

In central shower rooms where showers are seldom turned off until all workers have finished bathing, the peak consumption may be 300 gallons per hour for each shower head. Concurrently with shower consumption, a peak use of 40 to 50 gallons per hour should be allowed for each flush toilet. In camps occupied mainly by families where at least half the occupants are children, the peak consumption may last less than 1 hour when the proper number of fixtures is provided.

Where water for fire fighting is desired, the system should be capable of supplying 20 gallons per minute at a pressure of 60 pounds per square inch. Fire protection should be included in architectural design considerations for large camps.

Wells must be protected from surface pollution. Protect openings at the tops of wells with watertight covers. Slope concrete pump bases and platforms to drain water away from wells. Raise the edges of any access openings. Extend the casing, or sleeve, 6 inches above the platform and seal around the casing with asphalt. Use a tight pump base or well seal over the opening. If necessary, backfill with tamped clay or concrete around the casing. Build up the ground level so it slopes away from the well in all directions. If the well is on the side of a hill, build a diversion ditch about 50 feet above the pump.

Place a new well above any known source of pollution—septic tanks, privies, barn lots, pigpens, and surface drainage. The well should be at least 50 feet from a septic tank or dry well, 100 feet from a disposal field or seepage pit, and 150 feet from a cesspool unless greater distances are required by State or local codes.

Excreta and liquid-waste disposal

Problems of excreta and liquid-waste disposal are of vital concern to camp operators and public health worker because of the possibility of spreading diseases and the consequent reduction in the efficiency of the workers. Crew leaders, migrants, and their families should be instructed in the proper use and care of all facilities related to the disposal of excreta and liquid wastes.

The Federal regulations require that facilities must be provided and maintained for effective disposal of excreta and liquid waste. Raw or treated liquid waste must not be discharged or allowed to accumulate on the ground surface. Connect all facilities for disposal of excreta and liquid waste to the public sewer system where one is available. Where public sewers are not available, provide privies, portable toilets, a subsurface septic tank, or some other sanitary liquid-waste treatment and disposal system. Comply with all requirements of the State health authority.

Essentials for good housing

Buildings must be structurally sound, in good repair, and in a sanitary condition. They must provide weather protection and privacy for the occupants. They must be durable, functional, convenient, and aesthetically acceptable.

One of the prime considerations in building migrant-labor quarters is to determine whether single workers, families, or a combination of both will be housed. The grower or camp operator can only estimate the proportion of single persons and families and the size of families based on experiences in previous years. When possible, the units should be designed to house either single persons or families with minimum major alteration of structures.

Space and arrangement are primary considerations in design to provide for convenient, healthful living. State and local codes should be consulted before designing migrant housing, for, if they are more stringent than the Federal regulations, they take precedence as stated in Section 620.1, Item (b) of the Regulations.

Housing space and arrangements

Space

Federal regulations specify the following minimum space:

(a) For sleeping purposes only in family units and in dormitory accommodations using single beds, not less than 50 square feet of floor space per occupant.

(b) For sleeping purposes in dormitory accommodations using double bunk beds only, not less than 40 square feet per occupant.

(c) For combined cooking, eating, and sleeping purposes, not less than 60 square feet of floor space per occupant.

(d) At least one-half of the floor area in each living unit shall have a minimum ceiling height of 7 feet. No floor space shall be counted toward minimum requirements where the ceiling height is less than 5 feet.

(e) Separate sleeping accommodations shall be provided for each sex or each family.

(f) Adequate and separate arrangements for hanging clothing and storing personal effects for each person or family shall be provided.

These regulations should be recognized as minimum for health and safety of people. However, many camp owners have found it advantageous to provide somewhat more than these minimums—particularly for long-term occupancy and where adverse weather conditions force people inside during the day.

Separate sleeping facilities

Two good arrangements of minimum-space duplex sleeping quarters are illustrated in figure 2. Figure 3 illustrates good minimum-space arrangement of a single and multiunit dormitory where double-deck single bunks are used.

Double-deck single bunk sleeping units for two persons can be grouped as "pods" around a central building, housing kitchen, eating, and toilet facilities (fig. 4). These units afford flexibility for expansion and provide privacy, which appeals to many migrants.

Individual family units

A simple arrangement for cooking, eating, and sleeping combined in one unit provides the minimum space and separating partitions as required by the Federal regulations (fig. 5). It should be noted that the intent of the Federal regulations on partitions is for visual separation of adults and children. Full walls and doors are not required.

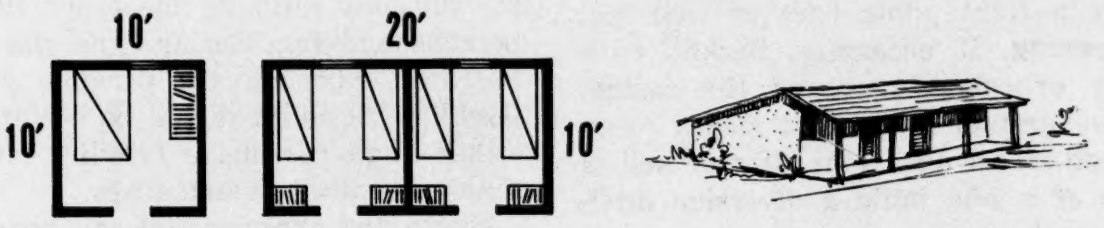


FIGURE 2.—Two arrangements for duplex sleeping quarters.

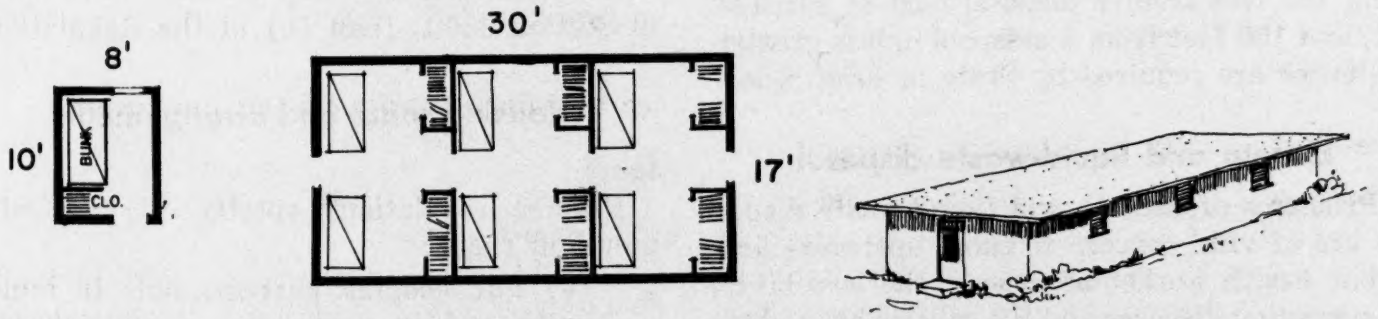


FIGURE 3.—Arrangement of single- and multiple-unit dormitory sleeping quarters with double-deck single bunks.

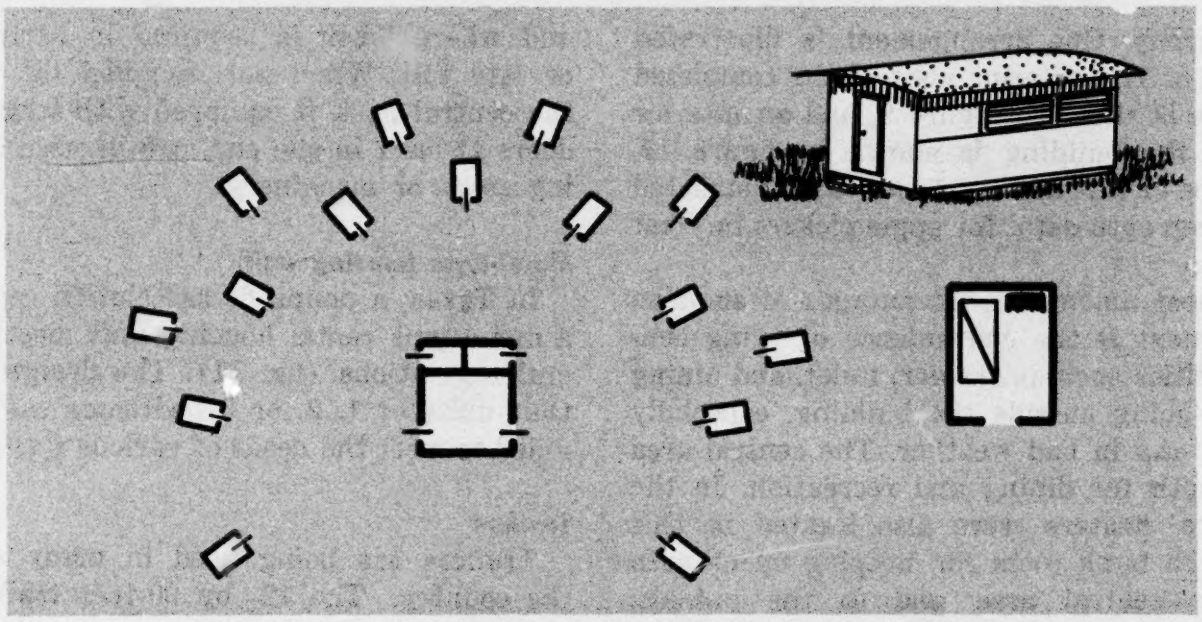


FIGURE 4.—Double-deck single bunk "pod" units grouped around a central facilities building. Also exterior sketch and detail plan of interior arrangement of a "pod" unit are shown.

More space than the minimum required may be desirable to attract better workers who may occupy the quarters as much as 4 to 6 months or more each year. A more liberal size of structure providing cooking, eating, toilet, and sleeping facilities for a family of four is shown in figure 6. A unit well above the minimum size for a family of four or five persons is shown in figure 7, with five persons, 90 square feet per person is provided.

From these units complete camps or housing developments can be designed.

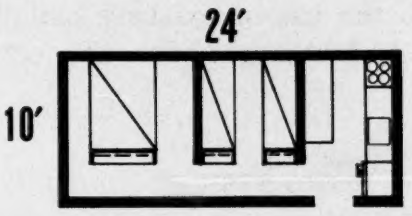
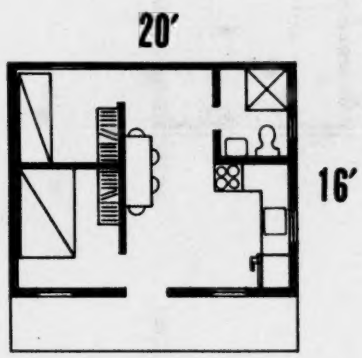


FIGURE 5.—Minimum space and arrangement for a family of four—cooking, eating, and sleeping.



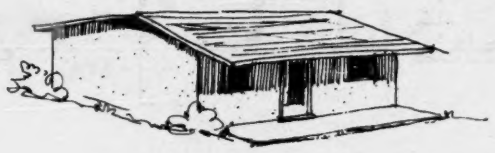


FIGURE 6.—Desirable space and arrangement for a family of four—cooking, eating, sleeping, and toilet facilities.

Sleeping and central-facilities combination

Combined sleeping and central cooking, eating, bath, and toilet facilities under one roof offers certain advantages for housing single men with perhaps one or two small families

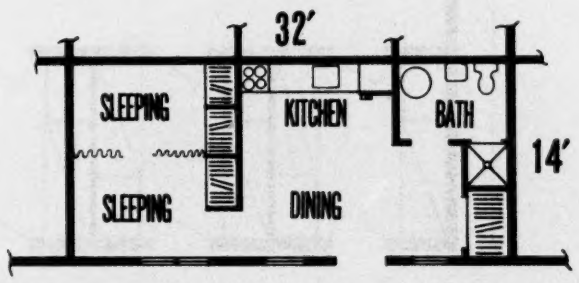


FIGURE 7.—A very comfortable unit well above the minimum for a family of four or five with adequate cooking, eating, sleeping, and toilet facilities.

in the group. One arrangement is illustrated in figure 8. The exterior view of the completed structure is shown in figure 9, and an interior view of the building is shown in figure 10. A protype of this arrangement was constructed and proven successful for apple pickers in West Virginia.

Foremost among the advantages of such an arrangement is the convenience of using central facilities such as shower, toilet, and dining without going outside the building, especially at night and in bad weather. The central area serves both for dining and recreation. In the prototype, heaters were also located in this area. Each bunk room for sleeping opens both into the central area and to the outside. Built-in bunks and individual closets equipped with hasps for locks in each bunk room are special features of the plan.

This type of arrangement is particularly adapted to the use of existing buildings, such as barns and storages, for the central unit and where labor is required in early spring or late fall. When not occupied by workers, the central part, if equipped with large double doors at least in one end, can be used for storing crops or machinery.

Motel-type housing unit

In Texas, a nonprofit association camp built a motel-type rental housing unit meeting Federal regulations (fig. 11). The design is such that units of 1, 2, or 3 bedrooms can be provided to meet the needs of various size families.

Trailers

Trailers are being used in many areas of the country. The 12- by 60-foot trailers now being produced make both permanent and convenient movable housing to meet the peak periods in many of the harvest areas. Trailers provide a high degree of flexibility in location. Ownership can be easily transferred, and financing does not involve land mortgaging.

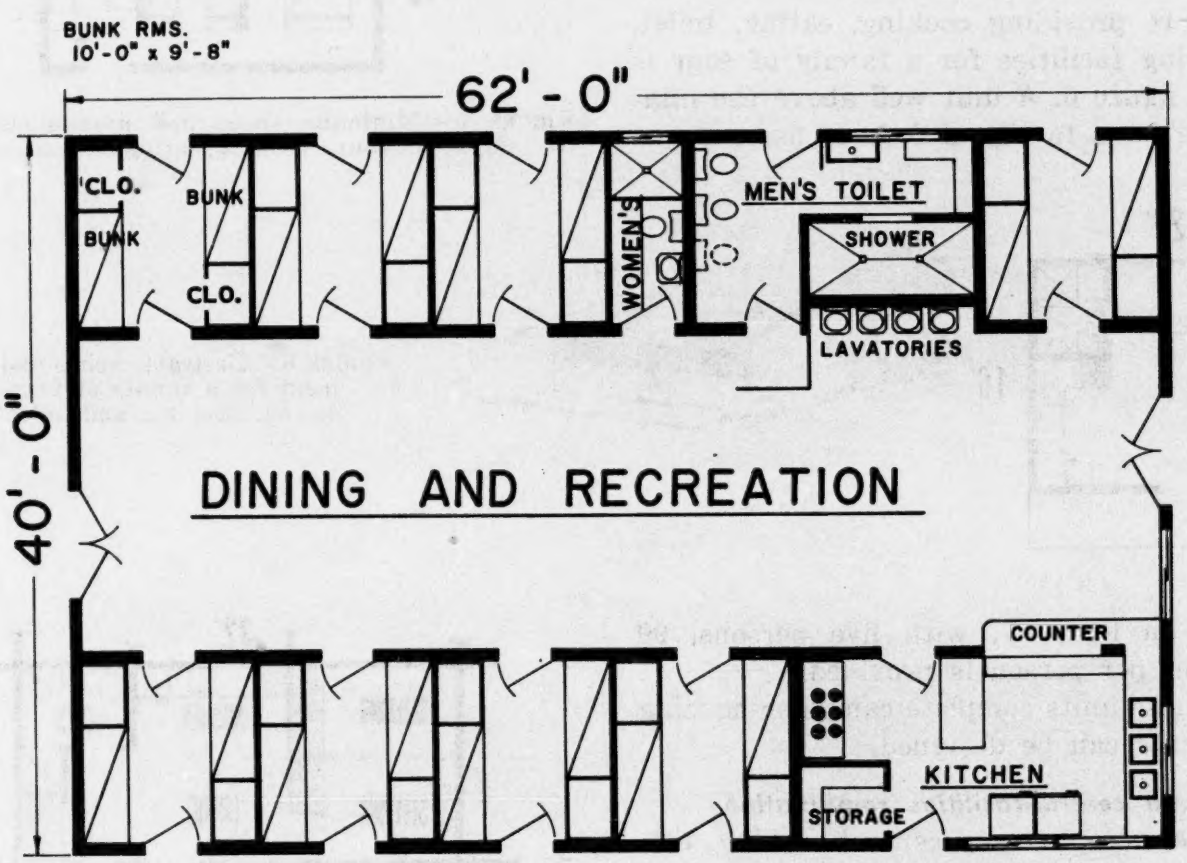


FIGURE 8.—Floor plan of sleeping and central-facilities combination.

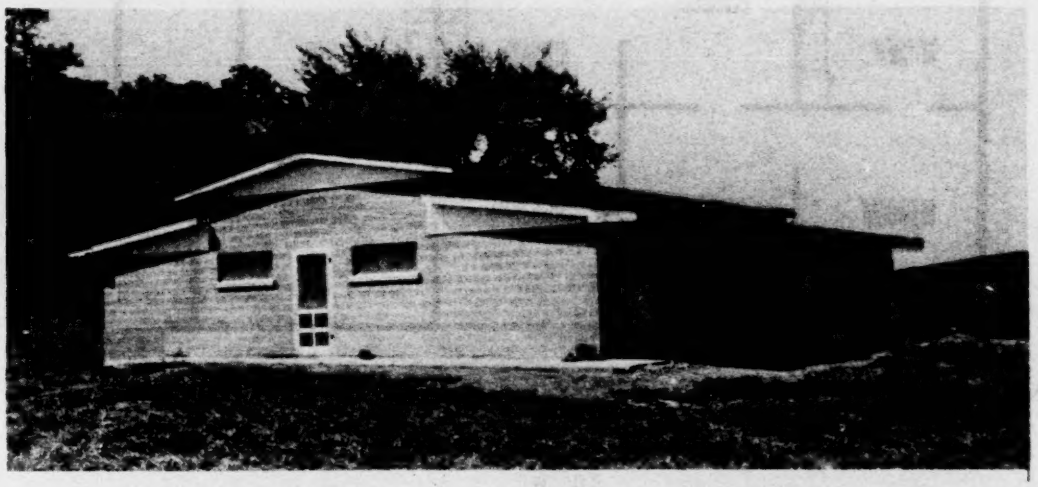


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FIGURE 9.—View of a completed building. The clerestory of the main building is covered with fiber-glass panels providing additional daytime lighting in the central area.

The sketch (fig. 12) shows room arrangements for family units in a conventional 12- by 60-foot trailer.

Choice of materials and construction methods

Construction cost must be low where facilities are used only a few weeks each year; therefore, materials must be selected accordingly. Locally available materials generally are the least costly for small projects, and construction labor is generally most efficient when using materials with which they are familiar.

In some areas concrete slab-on-grade floors with concrete block walls, metal windows, and conventional gable roofs are most advantageous; whereas, in other areas wood-frame with gable roofs prove the most economical construction. Flat roofs are often used with either type of construction.

Since migratory labor housing may be occupied by new tenants one or more times each season, the materials used must withstand frequent cleaning. Materials should withstand rough usage and have nonporous, smooth, hard surfaces, with a minimum of joints showing that may serve as breeding places for insects and vermin.

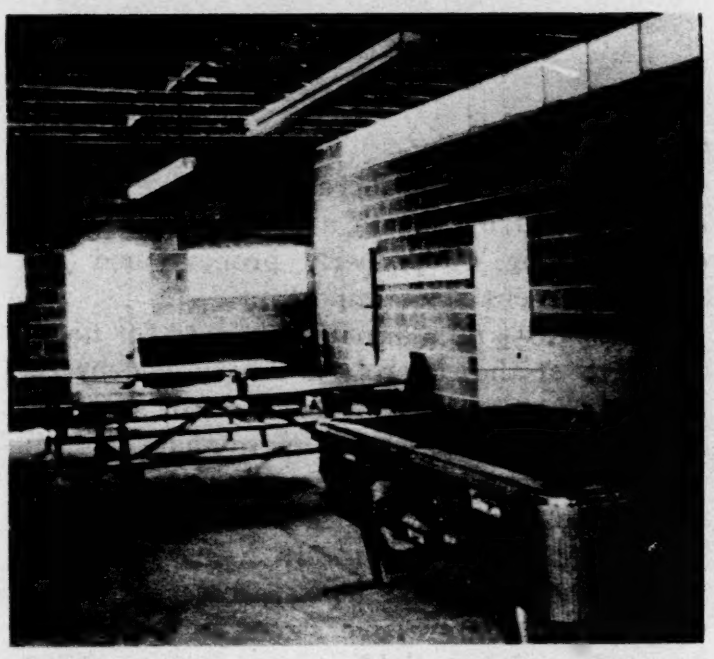

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FIGURE 10.—View of the inside of the building, showing the clerestory covered with fiber-glass panels.

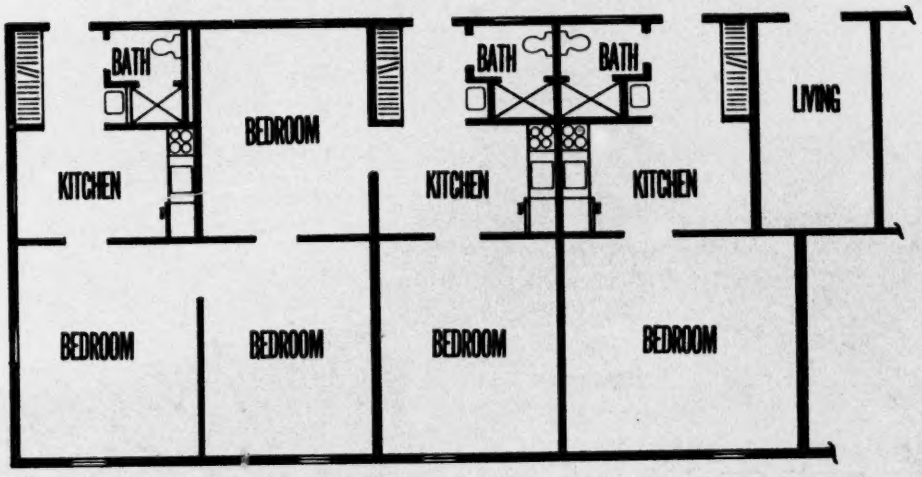

FIGURE 11.—Rental housing providing kitchen, bath, and toilet facilities with variable arrangements for 1, 2, or 3 bedrooms.

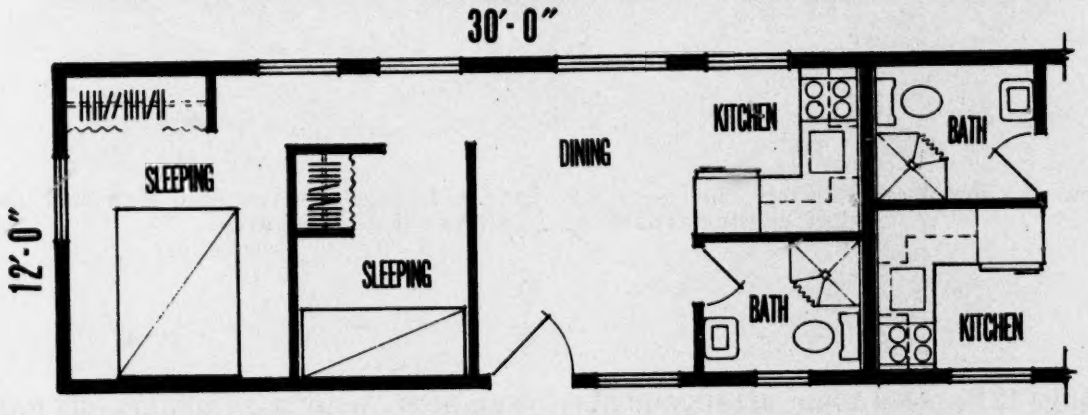

FIGURE 12.—Space utilization of a unit for a family of 4 persons within a two-family conventional 12- by 60-foot trailer.

Floors

Concrete floors.—Concrete floors are durable and can be troweled to a smooth surface for easy cleaning. A properly proportioned mix and proper curing is important.

A 1:2½:3½ mix is commonly used for floors. Strength of the concrete is determined by the amount of water used in mixing. For severe or moderate climates, use no more than 6½ gallons of water per sack of cement. If the sand and gravel are wet, reduce the water to 6 gallons per sack of cement. In using ready-mix concrete, buy a mix that is specified as giving 3,000-pound compressive strength. It is easier to work and less liable to crack than 2,500-pound concrete. Too much water will reduce strength and watertightness.

In cold weather or when curing time is short, use type III cement and 2 percent of calcium chloride by weight of the dry mix.

Normal thickness of floor slabs is 4 to 5 inches; but if hog-wire or welded-steel-mesh reinforcing is used, slabs may be as thin as 2 inches when laid over loam or sandy loam soils. Two inches may not be thick enough if laid over a highly expansible clay. A well-compacted or undisturbed soil is essential for the base of any slab.

Curing can be improved by keeping the concrete moist for 7 days after pouring. It can be 50 percent stronger than when kept in a dry atmosphere. Concrete can be kept moist by leaving forms in place and sprinkling or ponding with water. A layer of moist sand or a

covering of wetted burlap are other techniques. Sprinkling should be continuous rather than intermittent. A liquid seal coat may be applied in place of a covering or sprinkling. The seal hardens to form a thin membrane; this holds the moisture and promotes curing. Note: Follow manufacturer's directions in applying liquid slab coats.

Polyethylene film or vaporproof, fiber-reinforced paper laid over the earth base before pouring the concrete will reduce loss of moisture from the concrete into the soil to aid in curing. It will also reduce the upward movement of moisture in wet locations and help provide a dry floor.

Wood floors.—Wood floors are widely used in buildings with crawl-space platform design. Framing members for wood floors should be pressure-treated lumber. Untreated floors built off the ground are subject to termite infestation; hence, the ground underneath should be treated for termites.

Tongue-and-groove flooring usually contains cracks where insects and vermin can find refuge and moisture can collect. Plywood or a good grade of particle-board floors are suggested, as they have few, if any, voids and a minimum number of joints. They are economical and are easier to install than tongue-and-groove flooring. They also provide an excellent base for resilient tile and linoleum.

Floor coverings

Asphalt tile.—Asphalt tile may be laid on concrete, plywood, or a similar base. When properly laid and cared for, it provides a satisfactory floor covering. Asphalt tile tends to dent fairly easily and may be softened by spilled petroleum products. A grease-resistant type is available and should be used in migrant housing. Waterproof mastic should be used in laying the tile to prevent loosening from water used in cleaning. If poorly laid, especially when laid over uneven wood floors, it is liable to be unsanitary.

Vinyl asbestos tile.—Vinyl asbestos tile is slightly more expensive than asphalt tile, but it dents less easily and resists oil and grease better. It may be laid over on-grade concrete, wood, or similar base. Use waterproof mastic in laying.

Linoleum.—Linoleum is obtainable in standard widths of 6 to 12 feet so that it provides a floor covering with a minimum number of joints. It tends to dent but not so easily as asphalt tile. Lay with a waterproof mastic. Linoleum is not recommended over concrete floors on grade.

Vinyl.—Vinyl is also obtainable in 6 and 12 foot widths, and is more resistant to denting, staining, acids, and petroleum solvents than linoleum, but it is more expensive in first cost. Vinyl backed with felt should not be used over concrete floors on grade. Solid vinyl may be used over concrete. Follow manufacturer's recommendations for installation.

Walls and partitions

Concrete blocks.—Concrete blocks are popular wall and partition materials. Such surfaces can withstand heavy washdowns. They must have a smooth, nonporous facing in order to resist harborage of insects and vermin.

A surface bonding technique has been developed for erecting concrete block walls. The blocks are stacked dry in the desired pattern without mortar joints (fig. 13); the walls are coated on both sides with a cement mix that is reinforced with fiber-glass filament chopped to ½-inch lengths (fig. 14). The fiber-glass filament must be purchased with a chrome organic binder applied by the manufacturer to resist possible alkaline reaction of the cement. The filament-reinforced cement coating is best applied with a trowel. [3]

Framed walls with plywood siding. This type of construction may be used in most locations. With ½-inch plywood siding, studs may be placed 24 inches on center; with ¾-inch plywood, studs 48 inches on center are satis-

[3] For further information on this technique see: HAYNES, B. C., and SIMONS, J. W. SURFACE BONDING AND WATERPROOFING CEMENT COATING FOR CONCRETE BLOCK WALLS. Ga. Agr. Expt. Stas. Res. Rpt. 30, 7 pp. 1968.

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FIGURE 13.—Erecting walls by stacking concrete blocks dry without mortar.

factory. A lightweight portable sleeping unit built of plywood is shown in figure 15.

Corrugated galvanized steel or aluminum.— These materials are often used because of their ability to withstand abuse with minimum maintenance. Galvanized steel may be painted with aluminum or other light-colored paint to increase the reflection of solar heat. The use of an insulating lining on the interior of walls or roof is highly desirable whenever metal siding or roofing is used; otherwise, the building may be extremely hot in summer weather and cold in cool weather or cold climates. Shading helps to protect against sun.

Roofs

Probably the most important principle of roof design is simplicity. Simple roof designs (fig. 16) are easier to frame and require less material; therefore, they are cheaper to build. The hip roof is more difficult to frame and may take more material and labor to build than the other designs shown and makes the attic space more difficult to ventilate. Shed roofs are usually cheaper to build but limit the overall width of the building. Flat roofs require an expensive covering and maintenance if they

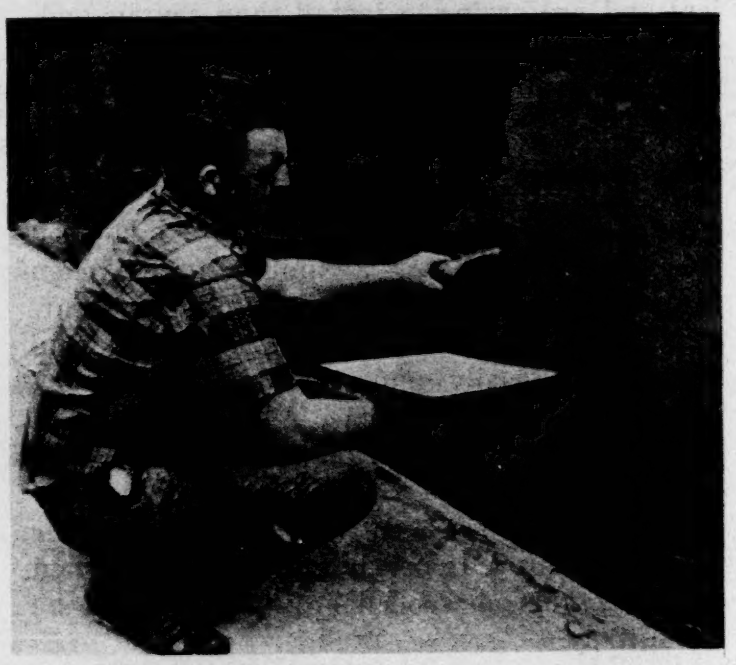

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FIGURE 14.—Applying surface bond coating on wall with a trowel.

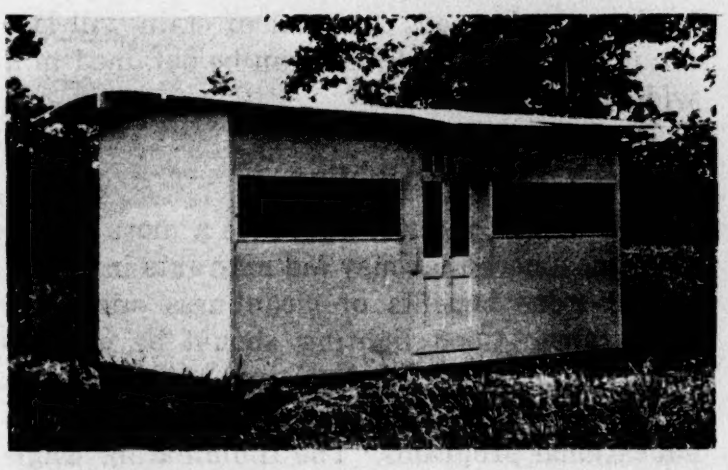

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FIGURE 15—A lightweight portable sleeping unit built of plywood. Note that the windows are a horizontal-sliding type with corrugated fiber-glass panels.

are to remain watertight, and they are hotter than some of the other types even with insulation.

An economical arched roof has been tried (see fig. 15) on narrow (8 or 10 feet wide) sleeping units. Ten- or twelve-foot lengths of ½-inch plywood (exterior grade) were bent over a 2- by 6-inch center beam running lengthwise of the building. This plywood length allowed a fair overhang on the sides; this eliminated need for gutters and protected the plywood sides from drip. The longitudinal edges of the sheets were butted, and these joints were caulked and covered with batten strips.

Roofing

Most roof-covering materials will serve well when properly applied.

Asphalt shingles and roll roofings.—Asphalt shingles and roll roofings are low-cost roof coverings and can be used over plywood sheathing. Asphalt shingles that provide for cementing or have interlocking tabs are usually worth their extra cost. Roll roofing usually has a much shorter life than asphalt shingles.

Selvage-edge roll roofing.—Selvage-edge roll roofing is applied double lapped, and the exposed part is coated with mineral granules. It costs more than ordinary roll roofing but lasts much longer.

Built-up roofing.—Built-up roofing may be used for flat and low-pitched roofs. It is applied by mopping layers of #15 roofing felt over unsaturated building paper with coats of bitumen. The final "flood" coat of bitumen is embedded with gravel surfacing. A metal gravel stop is needed at the eaves of a pitched roof and at all edges of a flat roof.

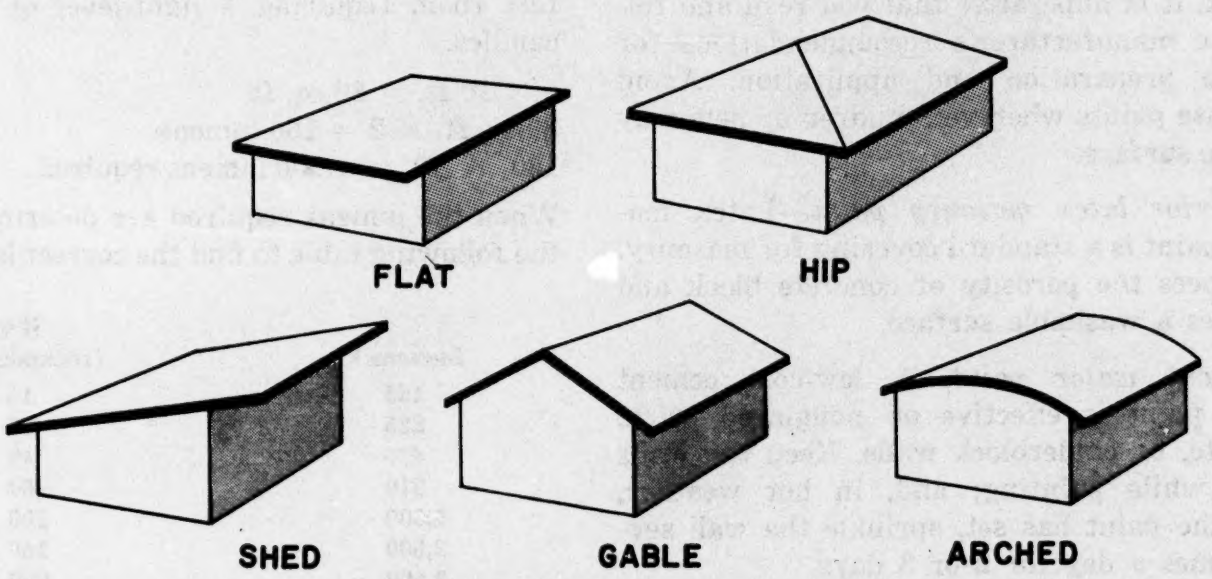

FIGURE 16.—Simple roof designs.

Corrugated metal roofing.—Corrugated metal roofing will usually span greater distance between supports than V-crimp. Either type provides an economical roof, as the surface is weatherproof and the roofing requires a minimum amount of lumber to support it.

Painting

Painted structures provide a neat appearance that should give migrants some incentive to take better care of a camp. Paint also helps protect the buildings against deterioration of the surface due to weather. In bright sunlight areas, light colors in pastel tones are very pleasing and make the housing attractive.

If you plan to paint a new building with a wood or plywood exterior, be sure to apply a prime coat immediately after erecting. Prime the edges of plywood panels with a good-quality exterior primer or an aluminum paint for wood. If the plywood is stored outdoors during construction, prime these edges as soon as the plywood is delivered to the site even though it may be covered. This retards moisture absorption that might later cause paint failure. In warm, damp climates the primer paint should contain a mildew inhibitor.

With so many paint formulations on the market, it is imperative that you read and follow the manufacturer's recommendations for surface preparation and application. Avoid lead-base paints wherever children or pets may lick the surface.

Exterior latex masonry paint.—Latex masonry paint is a standard covering for masonry. It reduces the porosity of concrete block and provides a washable surface.

Cement water paint.—A low-cost cement water paint is effective on nonglazed brick, concrete, or cinderblock walls. Keep the walls damp while painting; and, in hot weather, after the paint has set, sprinkle the wall several times a day for 2 or 3 days.

Stains.—Stains may be cheaper than paint, are easy to apply, and do not crack or peel. Some checking and surface roughening of the wood may be expected, but this does not detract from the appearance, especially of rough-sawn lumber or plywood. One coat of stain will last a number of years. Stains can be obtained in a wide variety of colors.

Lighting

Well-lighted interiors produce a more cheerful atmosphere that may aid migrants in recognizing some benefits of cleanliness and good appearance. Good lighting should be encouraged, especially for adults and children who may find reading necessary in connection with educational programs.[4] The Illuminating Engineering Society recommends a minimum light level of 10 foot-candles for areas used for relaxation, recreation, and conversation and for safety in passageways and a minimum light level of 30 foot-candles for work areas. These light levels may be measured with a light meter; but if one is not available, determine the lamp sizes needed for the recommended foot-candles by the following method: Multiply the square footage of the room by 2, since 2 lumens of lamp output per square foot are needed to obtain a light level of 1 foot-candle per square foot. Then multiply the result by the number of foot-candles recommended to obtain the lumens required.

Example: Find lumens required for an 8 × 10 feet room requiring a light-level of 10 foot-candles.

8 × 10 ft. = 80 sq. ft.
80 sq. ft. × 2 = 160 lumens
160 × 10 = 1,600 lumens required

When the lumens required are determined, use the following table to find the correct lamp size:

Lumens [1]	*Watt* (Incandescent)
125	15
225	25
430	40
810	60
1,600	100
2,500	150
3,500	200
5,490	300

[1] Illuminating Engineering Society Lighting Handbook 1966, pp. 8–44.

[4] U.S. Department of Agriculture Home and Garden Bulletin No. 138 "Planning Your Home Lighting."

These recommended minimums do not allow for close work or extensive reading. Each room should have at least one wall-type convenience outlet as reading lamps may be used for additional light. Dark interior surfaces are less reflective and require a higher wattage lamp to provide adequate lighting. All wiring and lighting fixtures must be installed according to applicable electrical codes and maintained in a safe condition.

For natural lighting, each habitable room must have at least one window or skylight opening directly to the out-of-doors. The minimum total window or skylight area including glazed openings in doors must equal 10 percent of the floor area. Where winter heating is not critical, larger window areas are desirable.

Glass transmits light readily, but it is broken easily and costly to replace. Plexiglass and vinyl panels are expensive, and polyethylene sheets deteriorate rapidly in light. Fiber-glass panels stand much abuse and are not too costly. Being translucent, they also provide privacy and eliminate the need for curtains or shades. Shades quickly become torn and dirty and constitute a fire hazard.

Corrugated fiber-glass window panels should be at least 0.045 inch thick and weigh at least 6 ounces per square foot. This thickness is satisfactory for flat panels in aluminum sash roughly 20 by 28 inches in size. A horizontal-sliding type of window is shown in figure 15 and a double-hung type in figure 17. The corrugated fiber-glass panels may be used to cover the top part of walls to provide additional lighting during the day.

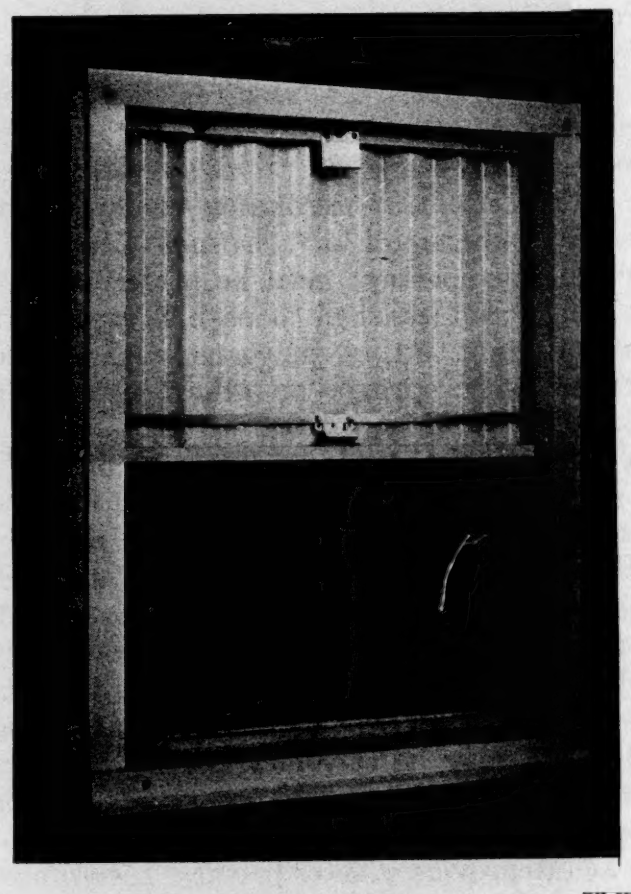

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FIGURE 17.—Double-hung window with corrugated fiber-glass panels sliding in slots in the jambs. No trim is required.

Ventilation and screening

Summer-comfort ventilation of all habitable rooms may be provided by window openings, ventilator openings, mechanical ventilation, or any combination of these. The total openable area of windows and doors must equal at least 45 percent of the required minimum window or skylight area, except where comparably adequate ventilation is supplied by mechanical means. Migrants seem to prefer natural ventilation over mechanical ventilation. They can adjust windows and doors to suit their individual needs. Where mechanical ventilation is used, one method is to provide ventilation thru the roof. The more desirable method is to use forced-air ventilation, in the form of gable-end louvered exhaust fans, with capacity sufficient to remove 4 to 8 c.f.m. per square foot of floor area. The large capacity is suggested for extremely hot climates.

For hot and arid climates, evaporative coolers add much comfort with relatively little extra cost. If exhaust-air ventilation is utilized, the attic area may be used as an oversized duct with grills for exhausting air from each room. (Note: If the attic area is used in this way, it is imperative that high-temperature-limit controls be furnished to interrupt operation of the forced-air circulation system in the event of fire). The usual practice in multiroom structures is to open the room door or provide an opening in the door so as to permit the flow of air from an open window, through the room, and to a centrally located exhaust point.

For cold weather, one air change per hour is considered adequate for comfort and will meet the minimum fresh-air requirements of the occupants. Air change from normal leakage around windows and doors will usually meet this need. Mechanical ventilation should be provided for commercial kitchens and toilets.

All outside openings must be protected with screening of not less than 16 mesh. Screen doors must be tight fitting, in good repair, and equipped with springs or other self-closing devices.

A combination of screened ventilation opening at the top of the wall and screened window opening is shown in figure 18. Space between rafters and plate provides added ventilation between roof and ceiling. Screen this space with hardware cloth to keep out birds. If housing is used in cold weather, provide closable flaps inside to reduce heat loss. Interior doors opening into a hall may be screened to provide cross ventilation (fig. 19). Slide on room side of door permits closing bottom part to reduce ventilation and to provide greater privacy. Install protective grills or hardware cloth over bottom part of door to protect fly screen. Large, shaded ventilation openings are highly desirable in hot climates (fig. 20) where air temperatures remain high at night.

Heating

A seasonal camp, operated in a cold climate, must be provided with safe heating equipment of sufficient capacity to maintain a temperature of 68° F. during occupancy. The required heater capacities to maintain this temperature in a 14- by 20-foot cabin or in rooms of this size in multiple units are given in tables 1, 2, and 3. Figures are given for wood-frame construction and concrete-block construction with and without insulation. Insulation is recommended for cold-season use especially with electric heat (figs. 21–23).

Heating equipment, other than electrical, must have an enclosed flame and be vented in such manner as to avoid hazardous or toxic accumulation of fumes or gas. Heating equipment operating with an external-jacket temperature higher than 140° F. should have a protection screen 3 feet high.

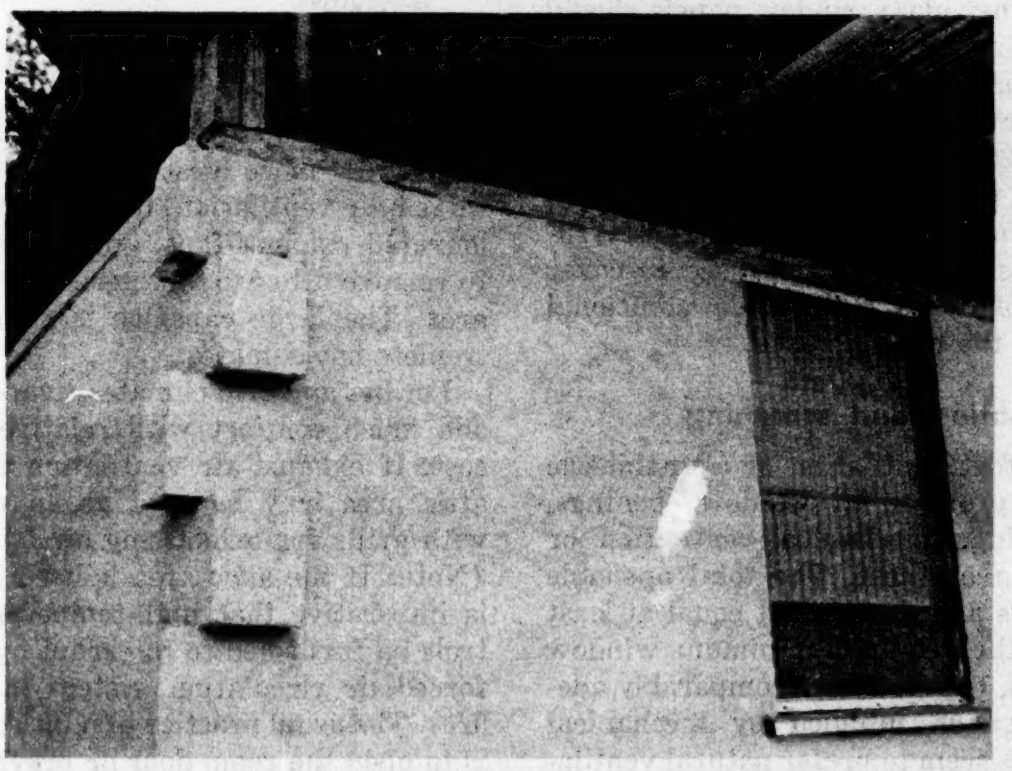

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FIGURE 18.—Ventilation is provided through screened opening at top of wall and through window.

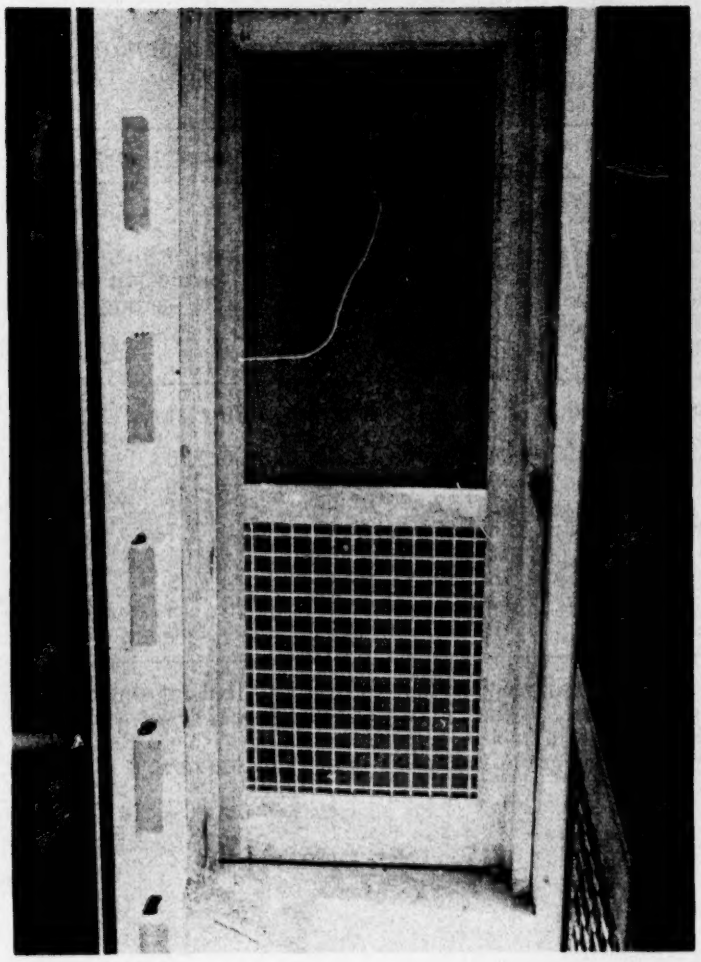

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FIGURE 19.—Cross ventilation is provided by screened bottom of interior doors opening into hall.

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FIGURE 20.—Large, shaded ventilation openings are highly desirable in hot climates.

Automatically operated heating equipment should include safety controls to shut off the fuel supply upon interruption or failure of flame or ignition. Safety controls prevent hazardous temperature or pressure buildup in steam or hot-water systems.

Vents for gas-fired space or radiant heaters are shown in figure 24. Vents of this type that pass through walls, ceilings, or roofs of combustible materials must be double tube metal-asbestos construction with ventilated thimbles.

TABLE 1.—*Required heating capacity to maintain 68° F. temperature in 14- x 20-foot cabin, exposed all sides, at various expected outside temperatures*

Outside temperature, ° F.	Wood-frame construction [1]						Concrete-block construction [2]			
	Crawl space open; no insulation		Crawl space enclosed; 3-inch fiber-glass insulation over ceiling				No insulation		3-inch fiber-glass insulation over ceiling	
			No insulation in walls		2-inch fiber-glass insulation in walls with ⅜-inch plywood wall finish					
	B.t.u./hr.	*Kw.*	*B.t.u./hr.*	*Kw.*	*B.t.u./hr.*	*Kw.*	*B.t.u./hr.*	*Kw.*	*B.t.u./hr.*	*Kw.*
−10	64,166	18.80	47,010	13.77	20,853	6.11	51,358	15.05	39,690	11.63
0	56,145	16.45	41,133	12.05	18,246	5.35	45,782	13.41	35,572	10.42
10	48,124	14.10	35,257	10.33	15,640	4.58	40,205	11.78	31,454	9.22
20	40,104	11.75	29,381	8.61	13,033	3.82	34,629	10.15	27,336	8.01
30	32,083	9.40	23,505	6.89	10,426	3.05	29,052	8.51	23,218	6.80
40	24,062	7.05	17,629	5.17	7,820	2.29	23,476	6.88	19,100	5.60
50	16,041	4.70	11,752	3.44	5,213	1.53	17,899	5.24	14,982	4.39
60	8,021	2.35	5,876	1.72	2,607	.76	12,323	3.61	10,864	3.18

[1] Wood frame on piers; ¾-inch plywood floor, ⅜-inch plywood interior, ¼-inch plywood ceiling, gable roof with gable end louvers, 3 double-hung windows 2 ft. 8 in. x 3 ft. 10 in., 1 door 2 ft. 8 in. x 6 ft. 8 in.

[2] Slab floor on grade; 8-inch concrete block. ¼-inch plywood ceiling, gable roof with gable end louvers, 3 projected steel windows 2 ft. 9 in. x 1 in., 1 door 2 ft. 8 in. x 6 ft. 8 in.

TABLE 2.—*Required heating capacity to maintain 68° F. temperature in 14- x 20-ft. interior room in single-row motel structure, at various expected outside temperatures*[1]

Outside temperature, ° F.	Wood-frame construction [2]						Concrete-block construction [3]			
	Crawl space open; no insulation		Crawl space enclosed; 3-inch fiber-glass insulation over ceiling				No insulation		3-inch fiber-glass insulation over ceiling	
			No insulation in walls		2-inch fiber-glass insulation in walls with ⅜-inch plywood wall finish					
	B.t.u./hr.	*Kw.*	*B.t.u./hr.*	*Kw.*	*B.t.u./hr.*	*Kw.*	*B.t.u./hr.*	*Kw.*	*B.t.u./hr.*	*Kw.*
−10	44,710	13.10	27,554	8.07	18,415	5.40	38,528	11.29	26,860	7.87
0	39,121	11.46	24,109	7.06	16,113	4.72	34,555	10.12	24,345	7.13
10	33,532	9.82	20,665	6.05	13,811	4.05	30,582	8.96	21,831	6.40
20	27,944	8.19	17,221	5.05	11,510	3.37	26,610	7.80	19,317	5.66
30	22,355	6.55	13,777	4.04	9,208	2.70	22,637	6.63	16,803	4.92
40	16,766	4.91	10,333	3.03	6,906	2.02	18,664	5.47	14,289	4.19
50	11,177	3.27	6,888	2.02	4,604	1.35	14,691	4.30	11,774	3.45
60	5,589	1.64	3,444	1.01	2,302	.67	10,719	3.14	9,260	2.71

[1] Assuming all rooms heated. In end rooms provide heating capacity nearly equivalent to that required for single cabin.
[2] Wood frame on piers; ¾-inch plywood floor, ⅜-inch plywood interior, ¼-inch plywood ceiling, gable roof with gable end louvers, 3 double-hung windows 2 ft. 8 in. x 3 ft. 10 in., 1 door 2 ft. 8 in. x 6 ft. 8 in.
[3] Slab floor on grade; 8-inch concrete block, ¼-inch plywood ceiling, gable roof with gable end louvers, 3 projected steel windows 2 ft. 9 in. x 4 ft. 1 in., 1 door 2 ft. 8 in. x 6 ft. 8 in.

TABLE 3.—*Required heating capacity to maintain 68° F. temperature in 14- x 20-ft. room in back-to-back motel structure, at various expected outside temperatures*[1]

Outside temperature, ° F.	Wood-frame construction [2]						Concrete-block construction [3]			
	Crawl space open; no insulation		Crawl space enclosed; 3-inch fiber-glass insulation over ceiling				No insulation		3-inch fiber-glass insulation over ceiling	
			No insulation in walls		2-inch fiber-glass insulation in walls with ⅜-inch plywood wall finish					
	B.t.u./hr.	*Kw.*	*B.t.u./hr.*	*Kw.*	*B.t.u./hr.*	*Kw.*	*B.t.u./hr.*	*Kw.*	*B.t.u./hr.*	*Kw.*
−10	39,634	11.61	22,478	6.59	16,142	4.73	34,003	9.96	22,335	6.54
0	34,680	10.16	19,669	5.76	14,125	4.14	30,596	8.96	20,386	5.97
10	29,726	8.71	16,859	4.94	12,107	3.55	27,189	7.97	18,438	5.40
20	24,772	7.26	14,049	4.12	10,089	2.96	23,782	6.97	16,489	4.83
30	19,817	5.81	11,239	3.29	8,071	2.36	20,374	5.97	14,540	4.26
40	14,863	4.35	8,429	2.47	6,053	1.77	16,967	4.97	12,592	3.69
50	9,909	2.90	5,620	1.65	4,036	1.18	13,560	3.97	10,643	3.12
60	4,954	1.45	2,810	.82	2,018	.59	10,153	2.97	8,695	2.55

[1] Assuming all rooms heated. In end rooms provide heating capacity nearly equivalent to that required for single cabin.
[2] Wood frame on piers; ¾-inch plywood floor, ⅜-inch plywood interior, ¼-inch plywood ceiling, gable roof with gable end louvers, 3 double-hung windows 2 ft. 8 in. x 3 ft. 10 in., 1 door 2 ft. 8 in. x 6 ft. 8 in.
[3] Slab floor on grade; 8-inch concrete block, ¼-inch plywood ceiling, gable roof with gable end louvers, 3 projected steel windows 2 ft. 9 in. x 4 ft. 1 in., 1 door 2 ft. 8 in. x 6 ft. 8 in.

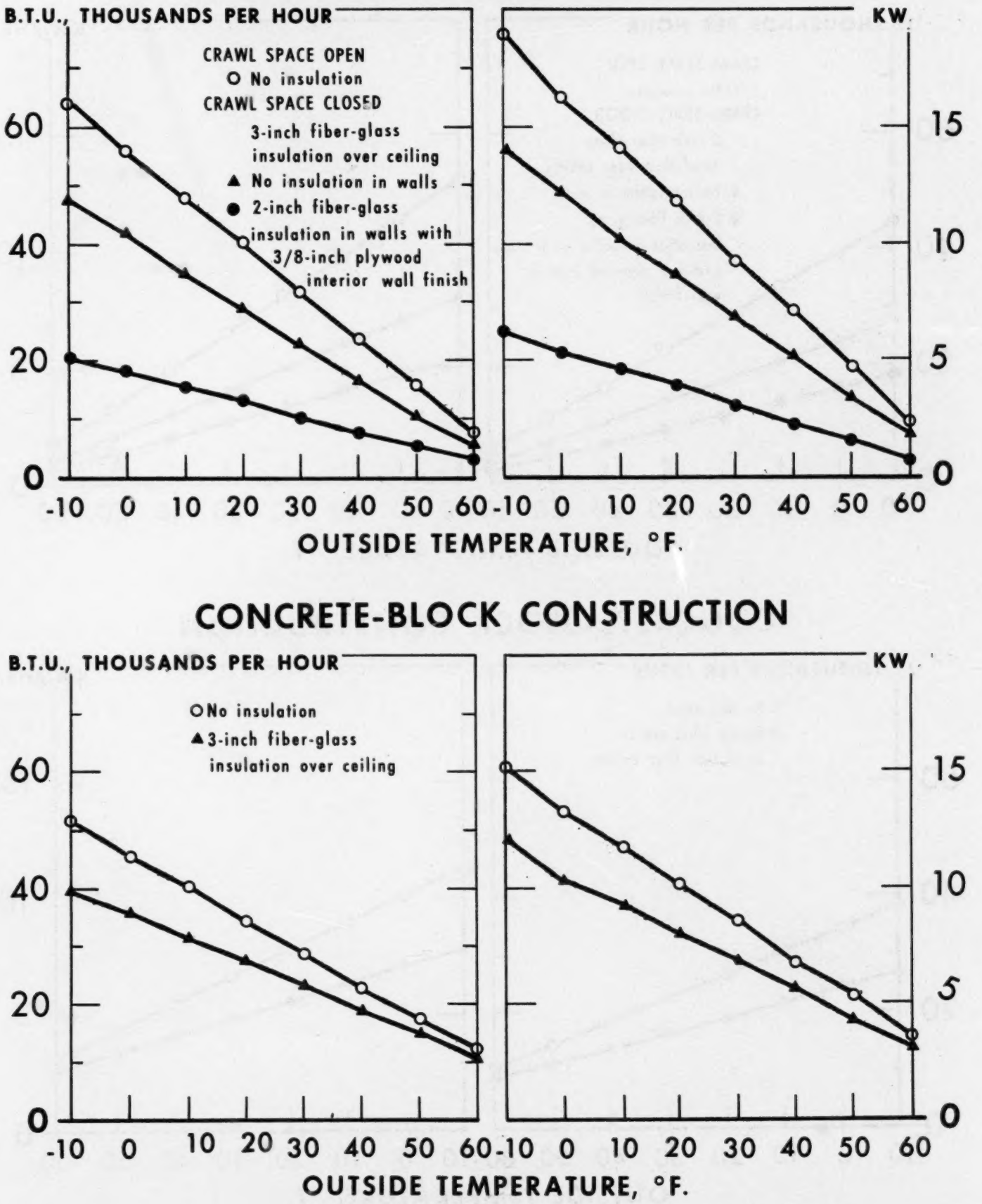
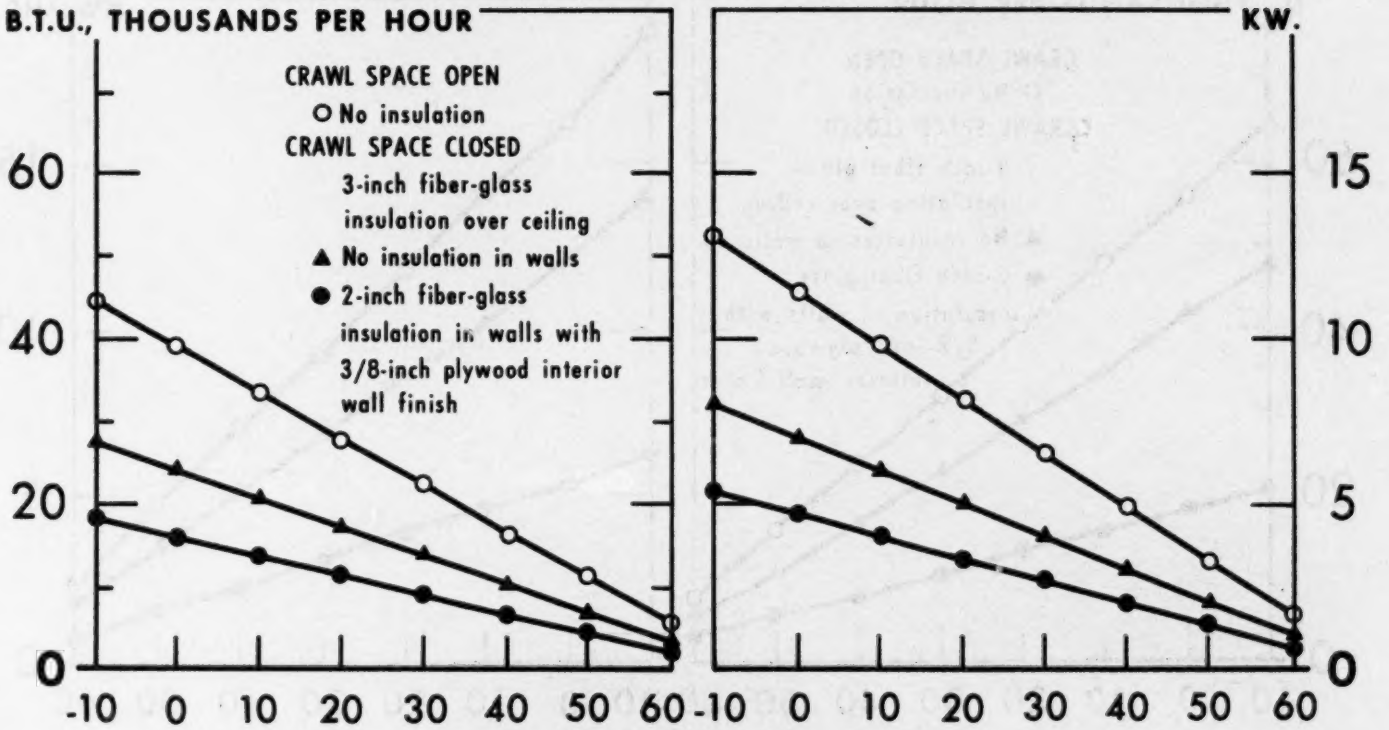


FIGURE 21.—Required heating capacity to maintain 68° F. temperature in 14- x 20-foot cabin, exposed all sides, at various expected outside temperatures. See footnotes to table 1 for details of construction.

WOOD-FRAME CONSTRUCTION



CONCRETE-BLOCK CONSTRUCTION

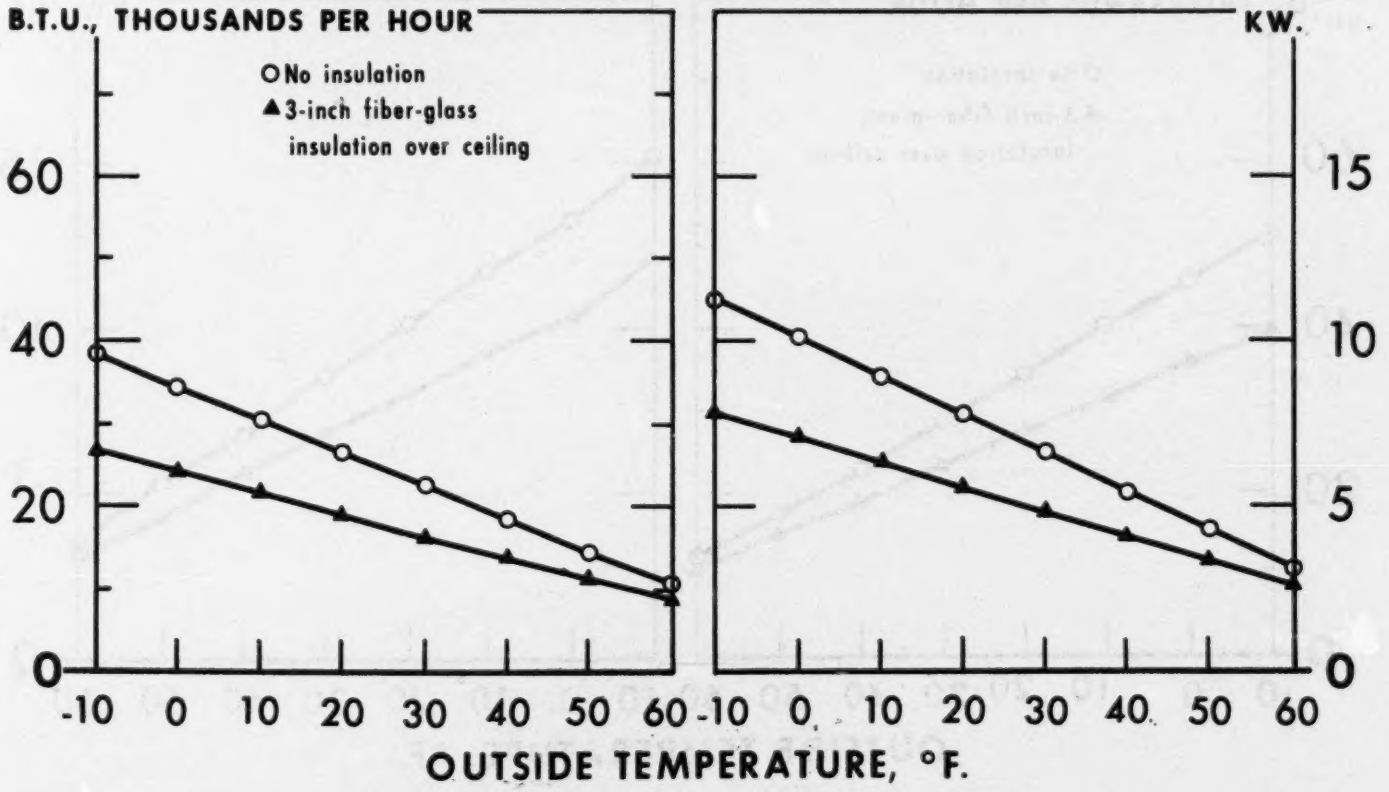
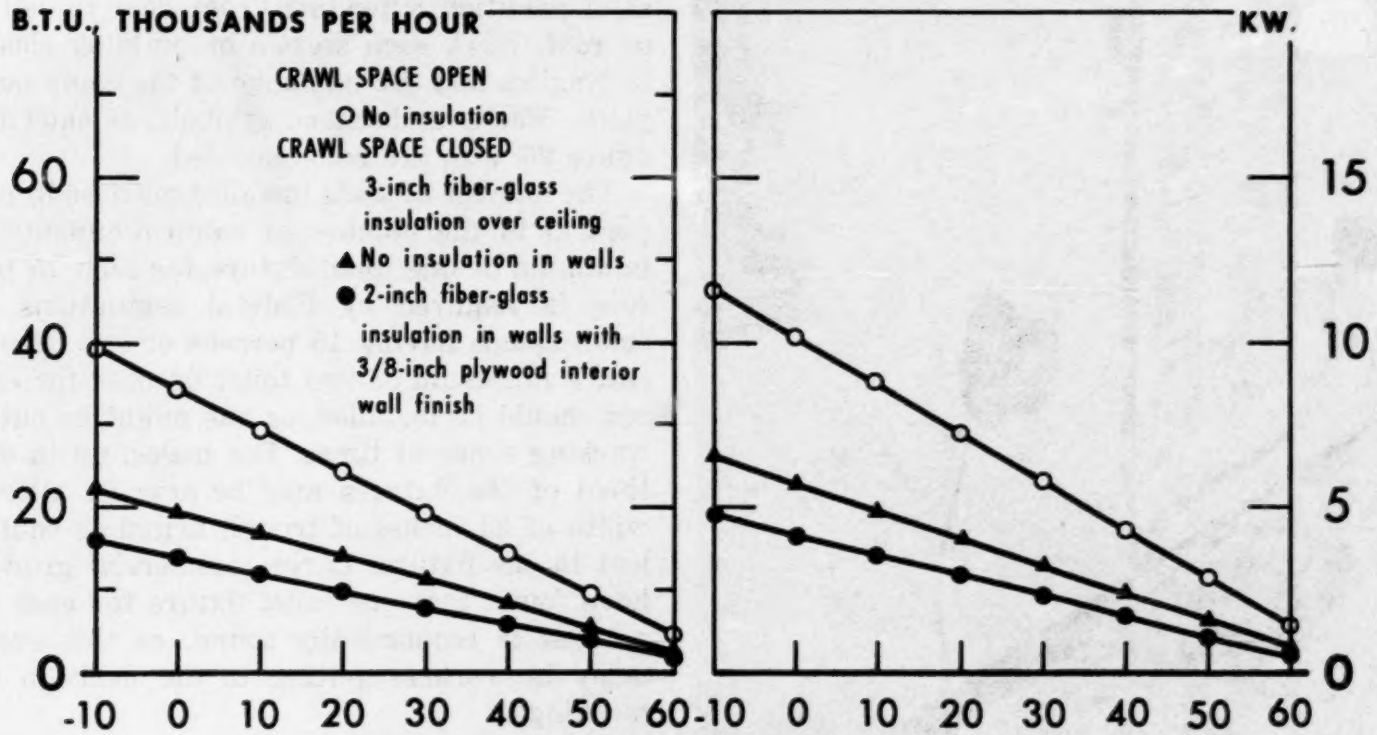


FIGURE 22.—Required heating capacity to maintain 68° F. temperature in 14- x 20-foot interior room in single-row motel stucture, at various expected outside temperatures. See footnotes to table 2 for details of construction.

WOOD-FRAME CONSTRUCTION



CONCRETE-BLOCK CONSTRUCTION

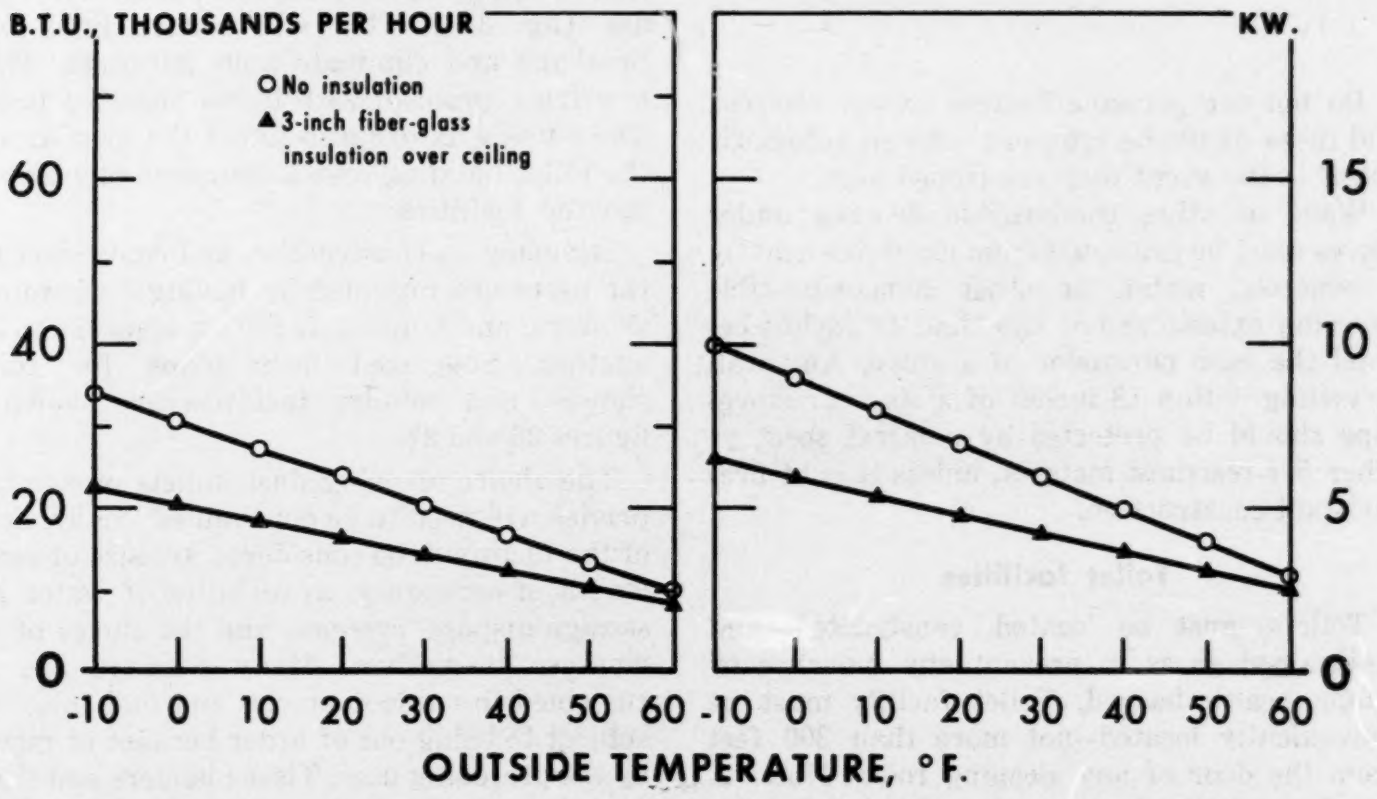
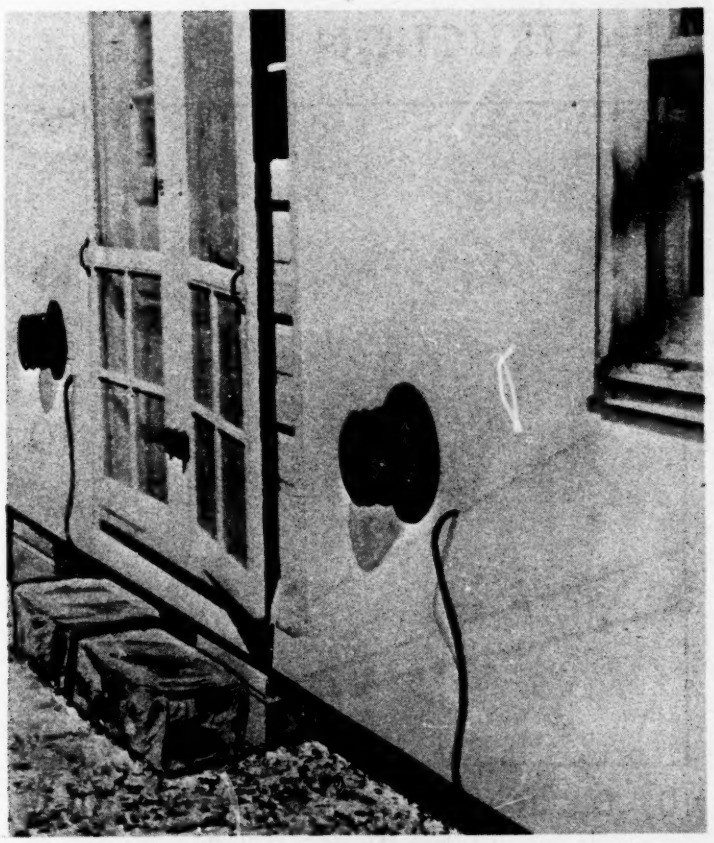


FIGURE 23.—Required heating capacity to maintain 68° F. temperature in 14- x 20-foot room back-to-back motel structure, at various expected outside temperatures. See footnotes to table 3 for details of construction.



BN-30346

FIGURE 24.—Through-the-wall vents for gas-fired space or radiant heaters. Fire-safe type must be used for wood frame walls.

Do not use portable heaters except electric, and these should be equipped with an automatic cutoff in the event they are tipped over.

Wood or other combustible flooring under stoves must be protected from excessive heat by a concrete, metal, or other noncombustible covering extending not less than 18 inches beyond the base perimeter of a stove. Any wall or ceiling within 18 inches of a stove or stovepipe should be protected by a metal sheet or other fire-resistant material unless it is of fire-resistant construction.

Toilet facilities

Toilets must be located, constructed, and maintained so as to prevent any nuisance or public health hazard. Toilet facility must be conveniently located—not more than 200 feet from the door of any sleeping room. Note: A privy must be no closer than 50 feet to any living unit, dining room, or kitchen.

In common-use toilet buildings, provide separate facilities for males and females with a solid partition extending from floor to ceiling or roof. Mark each section or building clearly in English and the language of the camp occupants. Easily understood symbols, as shown in figure 25, also are recommended.

The number of seats installed must be in proportion to the number of camp occupants. A minimum of one toilet fixture for each 15 persons is required by Federal regulations. In small camps having 15 persons or less of each sex, a minimum of two toilet fixtures for each sex should be installed, as one might be out of working order at times. For males, up to one-third of the fixtures may be urinals; allow a width of 24 inches of trough urinal as equivalent to one fixture. Large commercial growers have found that one toilet fixture for each six persons is economically sound, as this avoids delay in workers getting to the fields in the mornings.

Ventilation openings must be screened. One or more corrugated fiber-glass panels placed in the roof will admit daylight. A yard light with reflector mounted above the building provides light through the fiber-glass panels for night use (fig. 34). This will reduce light bulb breakage and eliminate bulb pilferage, which is often a problem with lights mounted inside. The outside fixture also lights the area around the toilet building and encourages migrants to use the facilities.

Economy in construction and convenience to the users are provided by having flush toilets, showers, and laundry facilities adjacent to one another. Suggested floor plans for toilet, shower, and laundry facilities are shown in figures 26 and 27.

The choice of using flush toilets or sanitary privies will need to be determined locally. Some of the factors to be considered are size of camp, length of occupancy, availability of water and sewage disposal systems, and the choice of the workers themselves. Many workers are accustomed to outdoor privies and find them less subject to being out of order because of misuse by the preceding user. Tissue holders and tissue must be provided and readily accessible in both flush toilets and privies.

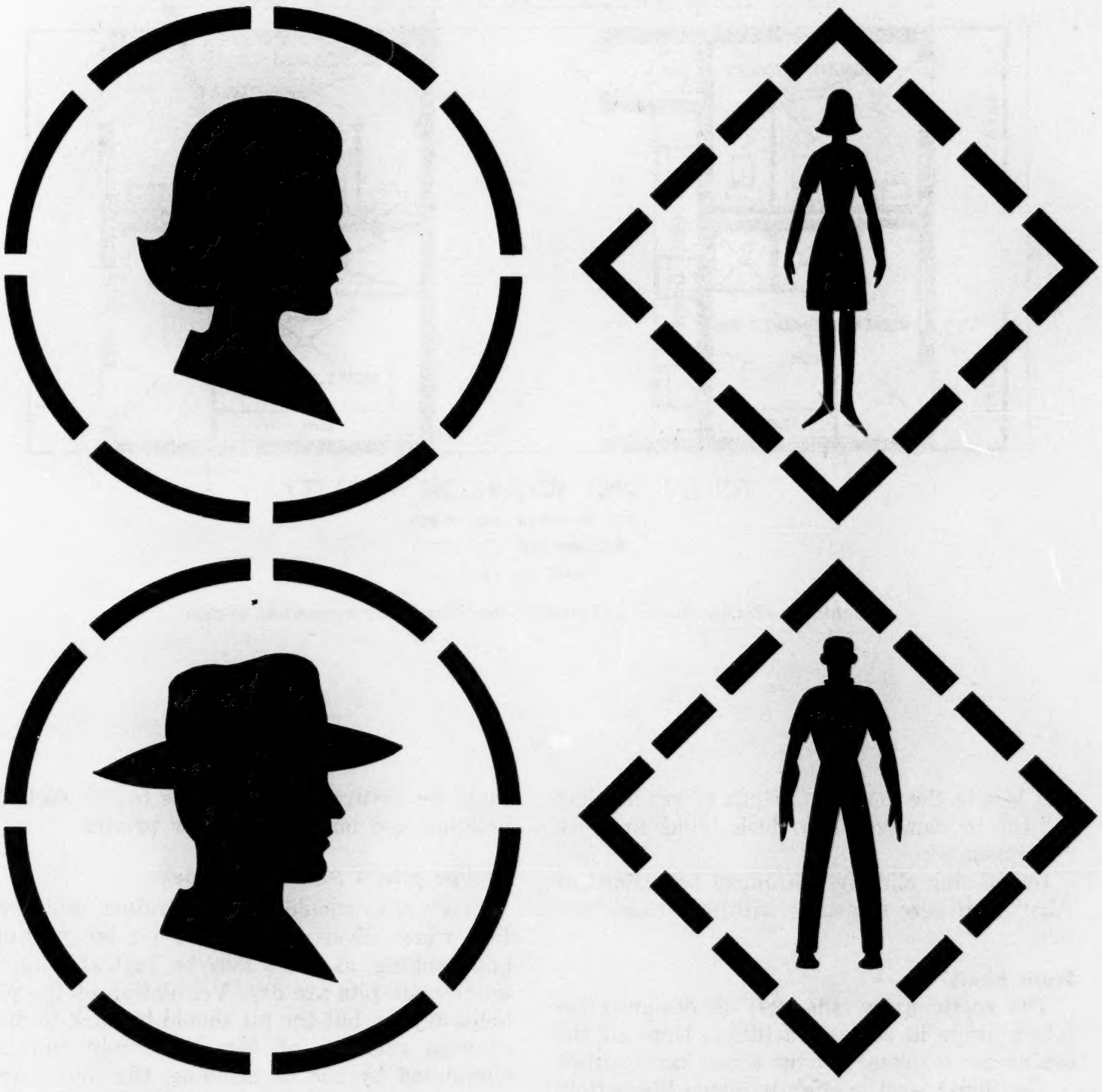


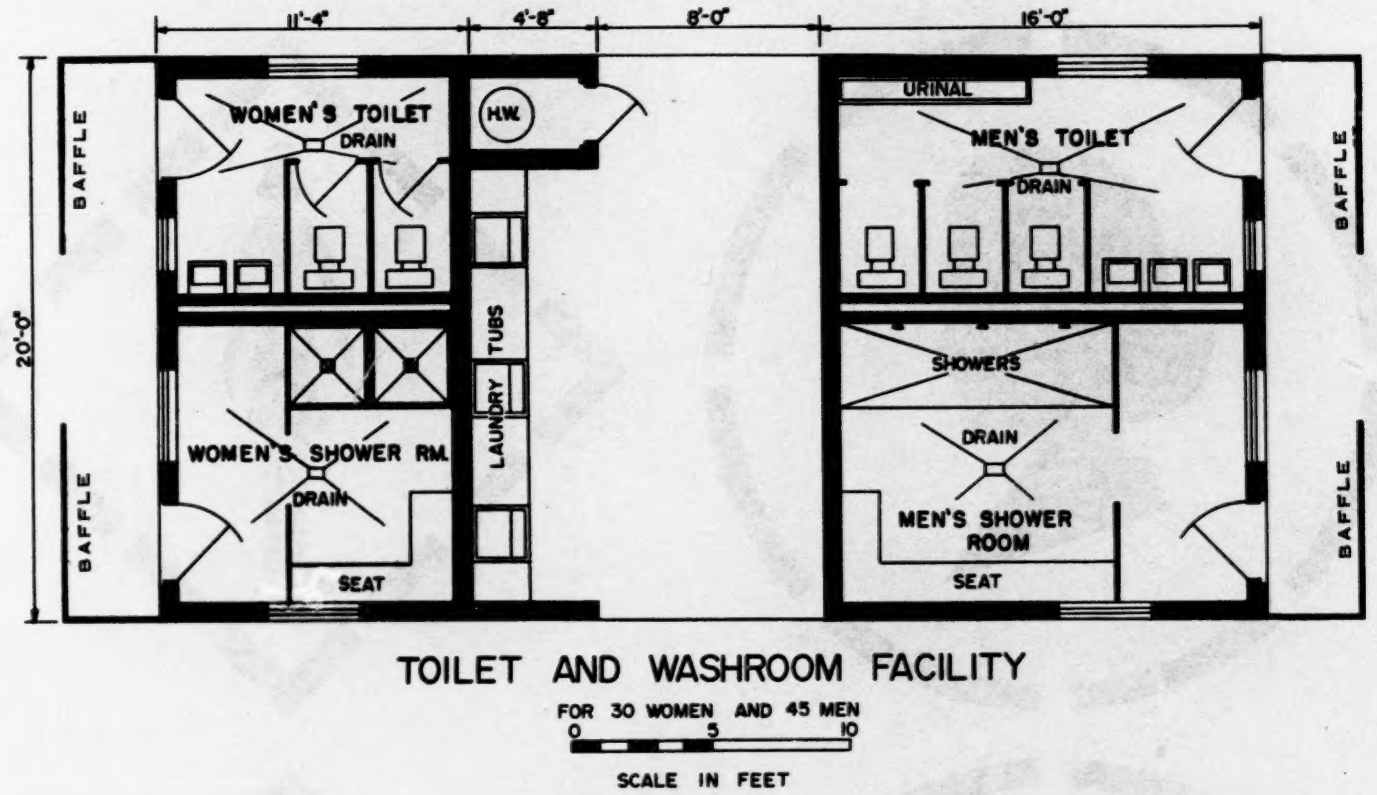
FIGURE 25.—Suggested symbols for marking toilet and shower facilities.

Flush toilets

When flush toilets are used, partitions are generally not required; but they are suggested between toilets for greater privacy. Inexpensive wood partitions are illustrated in figure 28.

Properly designed septic tanks and disposal fields or connection to a public sewage system is essential with flush toilets. Follow the recommendations of your State or county code when installing septic tanks and disposal fields.

Industrial cast-iron toilets, although costing more initially, are less easily damaged and may



TOILET AND WASHROOM FACILITY

FOR 30 WOMEN AND 45 MEN

0 5 10

SCALE IN FEET

FIGURE 26.—Toilet, shower, and laundry facilities for 30 women and 45 men.

cost less in the long run. Flush valves are less subject to damage than flush tanks and are recommended.

In freezing climates, drainage provisions or other antifreeze measures will need consideration.

Septic privies

The septic privy (fig. 29) is designed for rough usage in central facilities. None of the drains are trapped. Set the septic tank outlets so the liquid level is slightly above the bottom of the drop pipe; otherwise, the whole surface of the liquid in the tank contributes to odor in the building.

Chemical toilets

Chemical toilets are more desirable than privies when they are owned and maintained by a contractor, but they are less desirable if maintained by the camp owners. The unit cost is higher than that for privies, but in short-term camps the cost of chemical-toilet rentals could be favorably comparable to the cost of building and maintaining new privies.

Pit-type privies (traditional type)

Privy sites should be well drained and surface water diverted from the pit by grading and banking, as odors may be kept at a minimum when pits are dry. Ventilation of the pit helps drying, but the pit should be dark to discourage entrance of flies. Caving-in can be eliminated by use of cribbing (fig. 30). Approximately 38 cubic feet of pit per seat is the minimum needed in most migrant-labor camps. A depth of 6 feet is recommended for the privy pit.

The standard height for toilet seats is 14 inches. Separate privies for each family reduces conflicts and pinpoints responsibilities for cleanliness.

When the pit is filled to near ground height, it should be cleaned or the privy moved and the pit covered with 2 to 3 feet of earth. If the

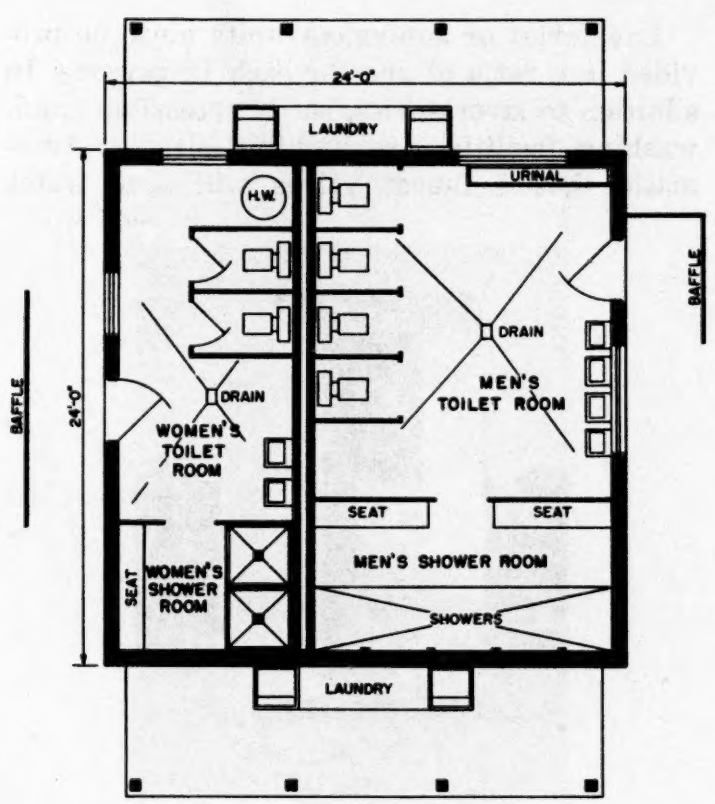


FIGURE 27.—Toilet, shower, and laundry facilities for 30 women and 60 men.

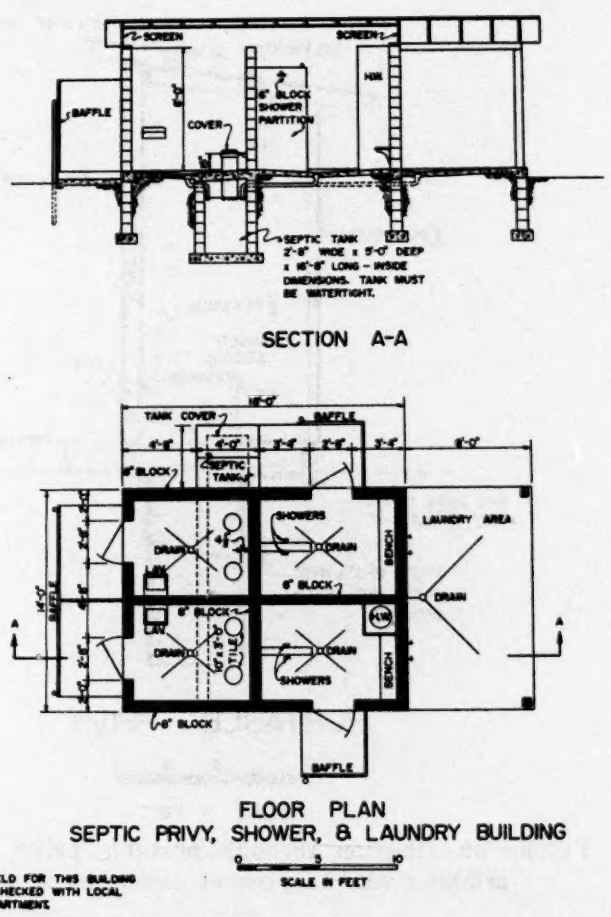


FIGURE 29.—Septic privy, shower, and laundry building. (Designed by Michigan State University.)

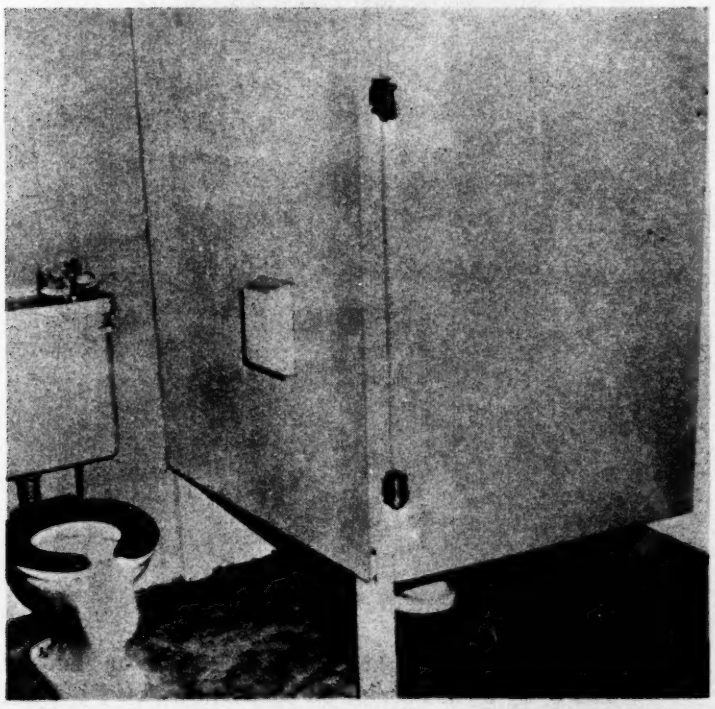


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FIGURE 28.—Inexpensive plywood partitions between toilets provide privacy. Sanitation is promoted if kept painted.

privy is to be moved, it must be structurally strong. A "one-holer" size with a preservative-treated lumber base and skids or adapted for handling by a forklift has been designed to meet this need (fig. 31).

A lightweight portable privy for field use is illustrated in figures 32 and 33. The 2 by 2's fastened to the back permit sliding the privy onto a truck for hauling to the field. The modified riser used in this privy may be adapted to multiple-unit semipermanent privies, such as shown in figure 34.

Facilities for bathing, laundering, and hand washing

Bathing and hand-washing facilities, supplied with hot and cold water under pressure, must be provided for the use of all occupants. These facilities must be clean and sanitary and located within 200 feet of each living unit.

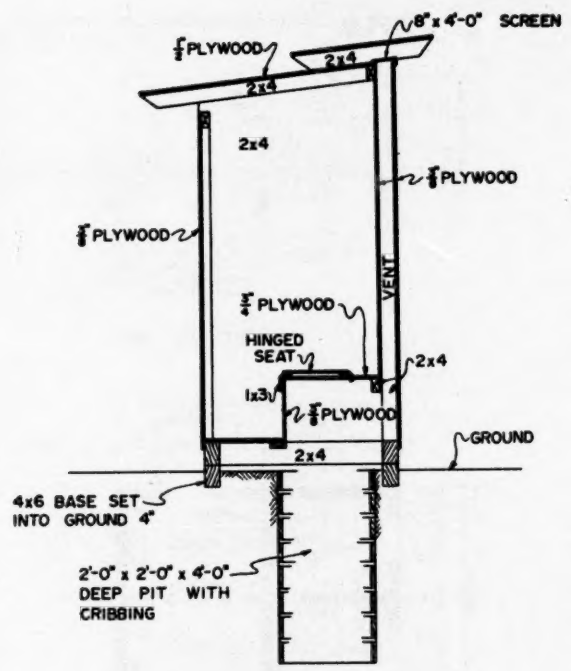

FIGURE 30.—Section through portable privy showing cribbing used to prevent caving-in of pit.

Lavatories or equivalent units must be provided in a ratio of one for each 15 persons. In addition to lavoratories, easily accessible handwashing facilities are highly desirable. Automatic shutoff faucet valves will save water

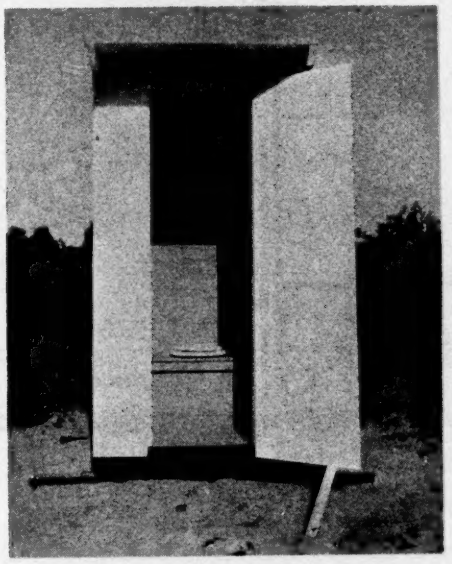

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FIGURE 31.—Movable privy equipped with skids. (Photograph—courtesy of Michigan State University.)

A minimum of one shower head for each 15 persons must be supplied. The shower heads must be spaced at least 3 feet apart, with a minimum of 9 square foot of floor space per unit. Adequate dry dressing space shall be provided in common-use facilities. Shower floors must be constructed of nonabsorbent, nonskid materials and sloped to properly constructed floor drains. Some camp managers have experienced difficulty with pilferage of fixtures. They have met the problem by using less attractive fixtures. Some have fabricated their own fixtures.

Except in individual family units, separate shower facilities must be provided each sex. When common-use shower facilities for both sexes are in the same building, they must be separated by a solid nonabsorbent wall extending from the floor to the ceiling, or roof, and must be plainly designated "men" or "women" in English and in the native language of the persons expected to occupy the housing.

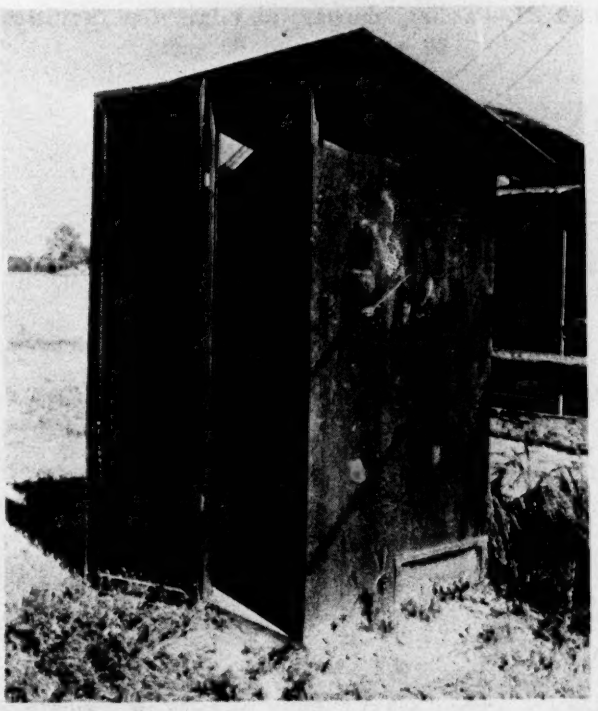

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FIGURE 32.—Lightweight, portable privy for field use. The 2- by 2-inch strips on back allow privy to be slid onto trucks for transporting to field. (Designed by Robert Martens, formerly of Washington State Public Health Service, now of U.S. Public Health Service.)

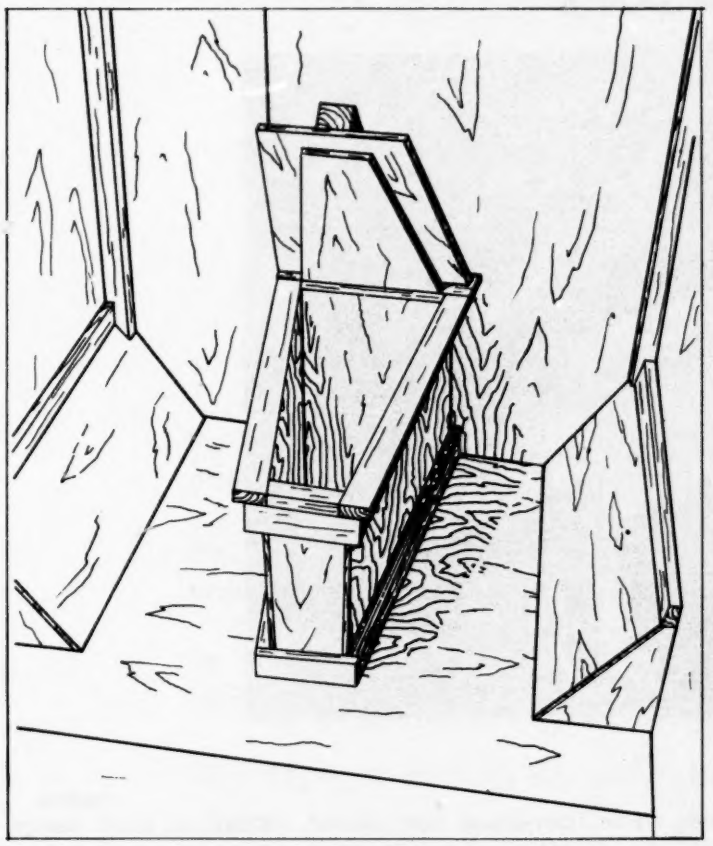

FIGURE 33.—Modified riser, built of wood, in portable privy for field use.

where the supply is short. For summer or warm climates this facility may be under an open shed (fig. 35). Laundry-type tubs may be used for this purpose as well as for laundry (fig. 36).

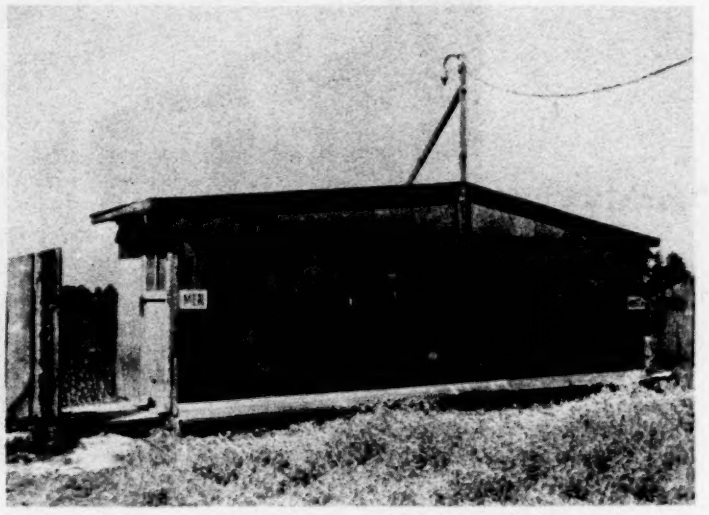

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FIGURE 34.—Multiple-unit semipermanent privy. Note protected ventilators at top and bottom of wall.

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FIGURE 35.—Easily accessible hand-washing facility under an open shed, for warm-season use.

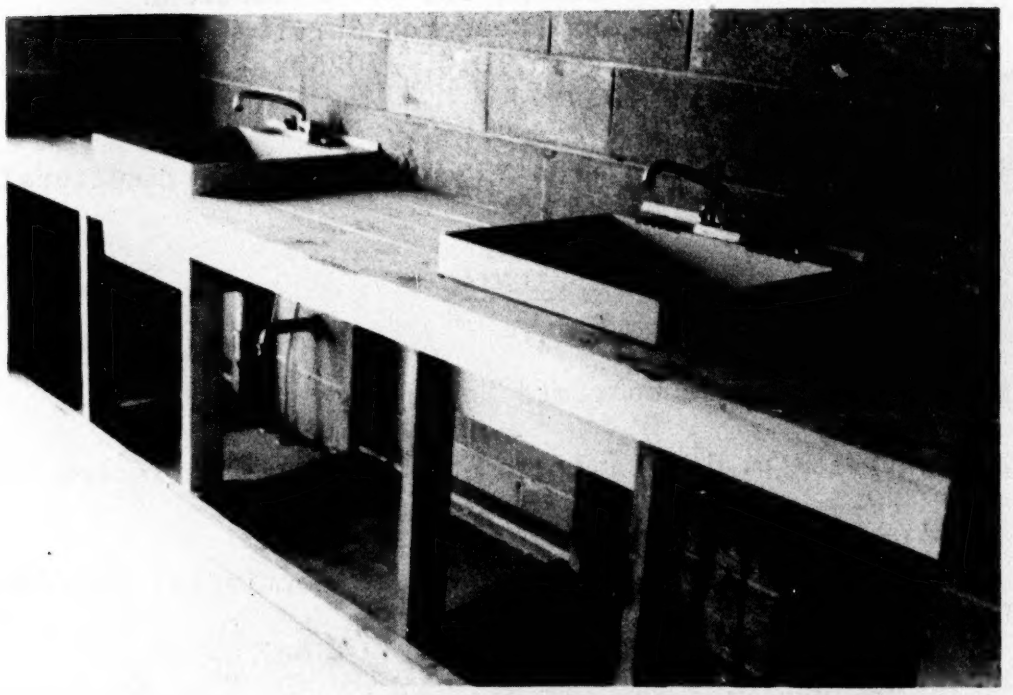

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FIGURE 36.—Laundry tubs may also be used for washing hands. The fiber-glass tubs shown withstand hard usage without chipping. The 2 by 4 in front should not be at the floor level, as shown, but should be raised to such a position as to allow toe space and easier floor cleaning.

Laundry facilities, supplied with hot and cold water under pressure, must be provided for the use of all occupants. Laundry trays or tubs must be provided in the ratio of one for each 25 persons. Mechanical washers may be provided in the ratio of one for each 50 persons in lieu of laundry trays; however, a minimum of one laundry tray for each 100 persons is recommended in addition to the mechanical washers.

Slope outside laundry area floors to a drain to prevent an adjacent muddy area. For summer use, from one to three sides of the area may be left open. A wide roof overhang helps to keep out rain. In a small camp, laundry, shower, and toilet facilities built in one end of an existing building (fig. 37) will provide protection from the weather.

Drying facilities aid in maintaining an orderly camp appearance and are appreciated by the occupants. About 30 feet of outside clothesline per family is suggested. Furnish supports and hooks located so the lines will not create a hazard to the occupants of the camp. The lines should be 4 to 8 inches apart and 10 to 14 feet long between supports. Installation of mechanical clothes dryers, especially in the larger camps, is becoming a common practice.

Cooking and eating facilities

For all cooking and eating areas there should be enough space around all appliances and furniture to allow for movement of traffic through the area, food preparation, serving and cleanup. Adequate storage for cooking and eating utensils, food supplies, and other supplies should be provided. Worktable, counter, and dining-table surfaces should be of materials that do not absorb grease, do not have seams where food and dirt may collect, and that may be easily washed, such as linoleum, vinyl, oilcloth, or metal. Chip-resistant cooking and eating utensils that can be easily cleaned and tight containers for food storage should be supplied.

Surfaces adjacent to all food preparation and

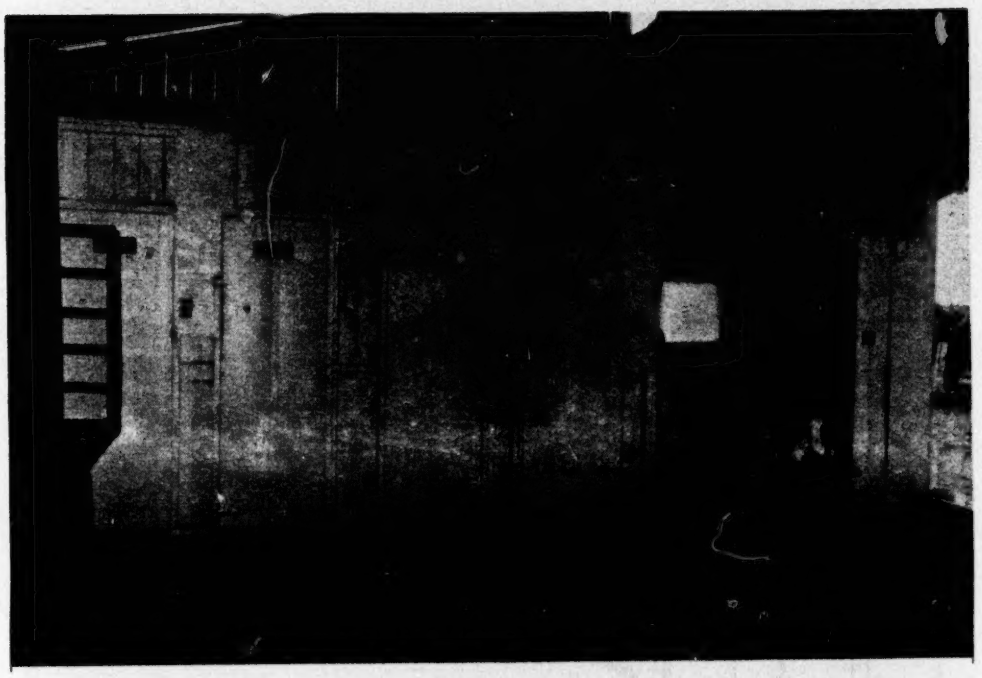


FIGURE 37.—Laundry, shower, and toilet facilities for a small camp built in an existing building provide protection from the weather and a clean play area for children.

cooking areas must be of nonabsorbent, easily cleaned materials. In addition the wall surface adjacent to cooking areas must be of fire-resistant material.

Individual units

When workers and their families are permitted or required to cook in their individual units, a space must be provided and equipped for cooking and eating. Such space must be provided with: (1) a cookstove or hotplate with a minimum of two burners; (2) adequate food-storage shelves and a counter for food preparation; (3) a mechanical refrigerator that will keep food at a temperature of 45° F. or less; (4) a table and chairs or equivalent seating and eating arrangements, all commensurate with the capacity of the unit; and (5) adequate lighting and ventilation.

Various kitchen arrangements are possible and a simple one is shown in figure 38. The length of the base and wall cabinets will depend somewhat on the space available. Where space is adequate, the minimum counter width to the left of the sink should be 18 inches and to the right 24 inches. The standard counter depth from front to back is 24 inches and the height of the top is 36 inches above the floor. Usually the bottom of the wall cabinet is 14 inches above the counter top of the base cabinet. The wall cabinet has shelves 11½ inches deep (front to back).

Communal cooking and eating

When workers or their families are permitted or required to cook and eat in a common facility, Federal regulations necessitate that a room or building separate from the sleeping facilities be provided. Such a facility must be supplied with the following equipment: (1) stoves or hotplates, with a minimum equivalent of two burners, in a ratio of one stove or hotplate to 10 persons; (2) adequate food-storage shelves and a counter for food preparation; (3) a mechanical refrigerator for food storage at a temperature of 45° F. or less; (4) tables and chairs or the equivalent seating adequate for the intended use of the facility; and (5) sinks with hot and cold water under pressure. Floors should be of nonabsorbent, easy-to-clean materials.

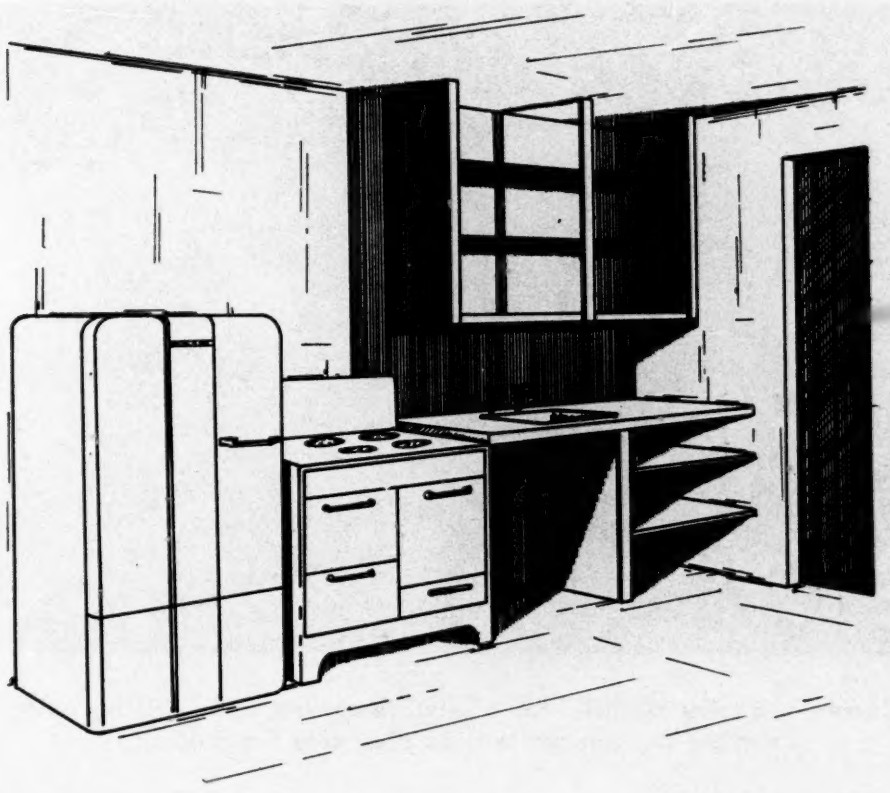


FIGURE 38.—A simple kitchen arrangement for family migrant labor housing.

Central mess facilities

When central mess facilities are provided, Federal regulations require the kitchen and dining area to be in proper proportion to the capacity of the housing and to be separate from the sleeping quarters. The physical facilities, equipment, and operation must be in accordance with provisions of applicable State codes. Examples of clean, well-equipped, and sanitary kitchens are illustrated in figure 39.

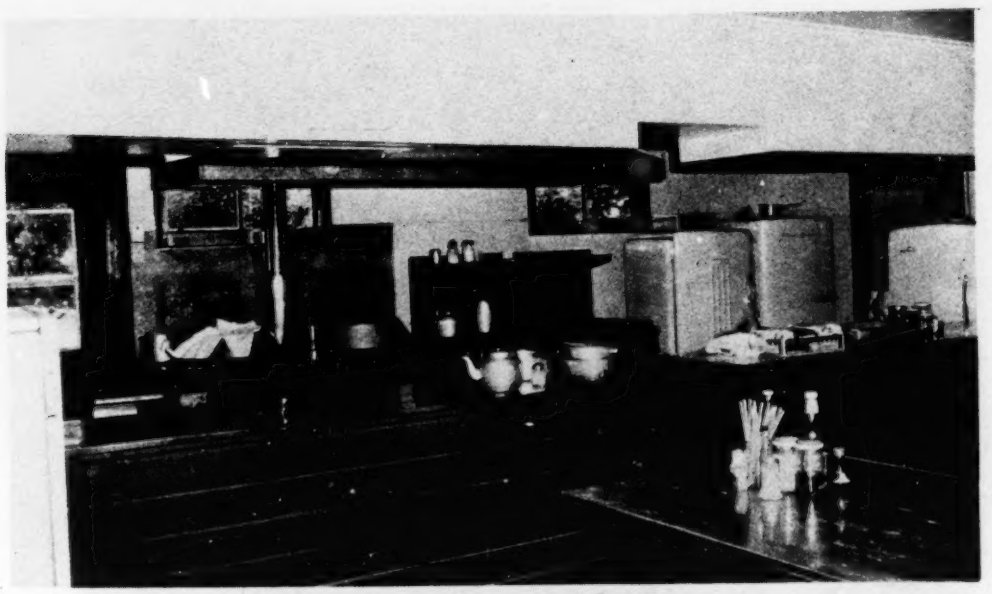
Ideally dining facilities should be large enough to allow all persons in the camp to be seated at one time. Allow a minimum of 10 square feet per person seated with tables 30 inches wide spaced 4 feet apart. Persons seated on both sides of the table should have at least 20 inches of bench length per person. Dining hall and kitchen arrangements are shown in figure 40.

Garbage and other refuse disposal

Durable, flytight, clean containers in good condition and of a minimum capacity of 20 gallons must be provided adjacent to each housing unit for storing garbage and other refuse. Provide these containers in a minimum ratio of one for each 15 persons.

Refuse should be collected at least twice a week or more often if necessary. The disposal of refuse, including garbage, must be in accordance with State and local law. One of the migrant families might be hired for this work.

A central garbage facility (fig. 41) is desirable—particularly for large camps. Central gar-



BN-36342; BN-36343

FIGURE 39.—Examples of clean, well-equipped kitchens in small central camps. In lower photo note that serving center is not conveniently located for refilling serving containers.

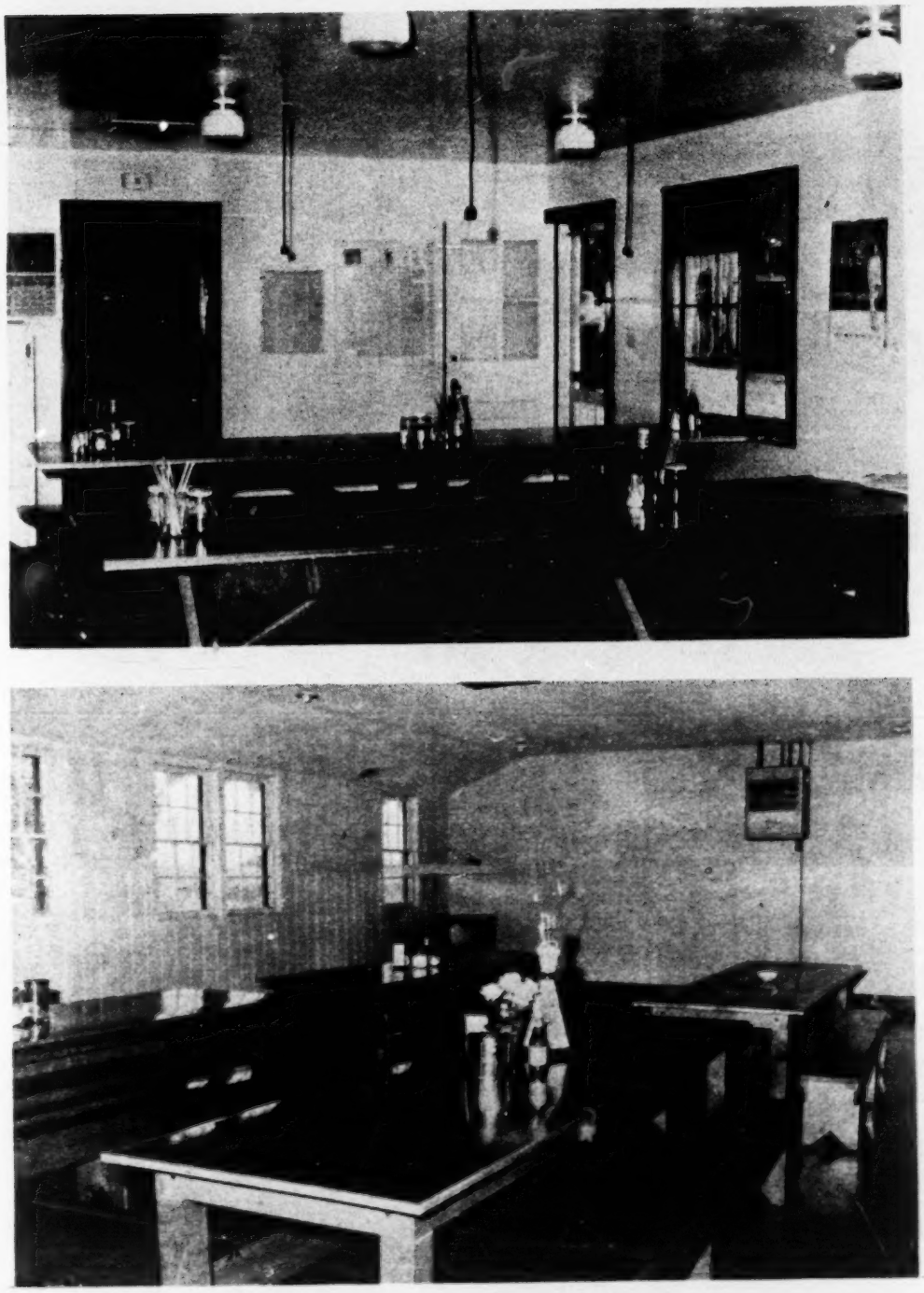


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FIGURE 40.—Examples of clean, well-arranged dining room for migrant-labor camps. In top photo, note good lighting and well-painted surfaces. A ceiling ventilator helps to remove odors and smoke. Benches attached to tables avoid displacement and reduce handling when cleaning the floor. Unit heater, as shown in bottom photo, is an effective way of providing the necessary heat in cold weather. Workers can watch television during meals and at night.

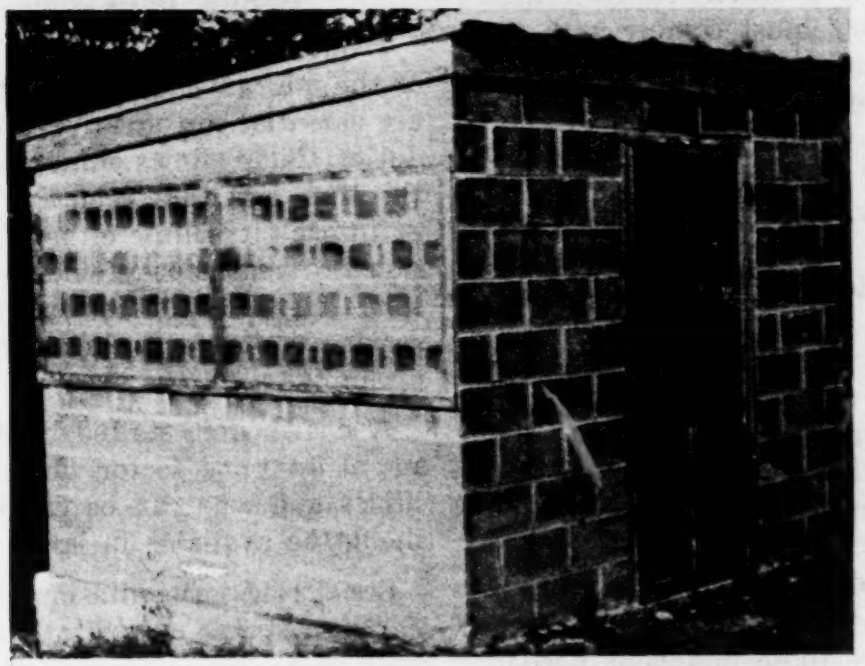

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FIGURE 41.—A well-ventilated central garbage storage. Note part of wall is laid with blocks on sides to provide large ventilated area. This part of wall is screened to keep out flies, birds, rodents, and other pests.

bage storage should be convenient to the central kitchen, roofed, and well-ventilated. Screen all openings, including the door. Provide a mechanical closure on the door so that it will close automatically after each use.

Incinerators for disposing of trash are allowed in some areas, but they should be designed so as to avoid being an air-pollution nuisance.

Insect and rodent control

Housing and facilities must be kept free of insects, rodents, and other vermin. Insect control may be done by screening openings, proper spraying, and keeping the premises free of waste that might harbor and incubate insects. Cleanliness will also deter vermin. Poison baits are helpful in keeping the camp free of rodents and other vermin. Note: Chemicals when properly used are helpful; but they must be used according to instructions on the label, and all safety precautions must be strictly observed.

Fire, safety, and first aid

All buildings in which people sleep or eat must be constructed and maintained in accordance with applicable State or local fire and safety laws.

In family housing and housing units for less than 10 persons, of one-story construction, two means of escape shall be provided. One of the two required means of escape may be a readily accessible window with an openable space of not less than 24 by 24 inches.

All sleeping quarters intended for use by 10 or more persons, central dining facilities, and common-assembly rooms must have at least two doors remotely separated to provide alternate means of escape to the outside or to an interior hall.

Sleeping quarters and common-assembly rooms on the second story must have at least one stairway and a permanent, fixed exterior ladder or a second stairway.

Sleeping and common-assembly rooms located above the second story must comply with the State and local fire and building codes relative to multiple-story dwellings.

Fire-extinguishing equipment shall be provided and located not more than 100 feet from each housing unit. Such equipment shall provide protection equal to that furnished by one 5-pound carbon dioxide or one 4-pound dry powder fire extinguisher.

First-aid facilities shall be provided and readily accessible for use at all times. Such facilities shall be equivalent to the 16-unit first-aid kit recommended by the American Red Cross and provided in a ratio of one for each 50 persons.

No flammable or volatile liquids or materials may be stored in or adjacent to rooms used for living purposes except those materials needed for current household use.

Agricultural pesticides and toxic chemicals shall not be stored in the housing area.

Health units and sanitation

Health and sanitation are important aspects or the migrant-labor problem. Healthy workers are essential for effective performance of their duties. Camp clinics eliminate or greatly reduce the time loss that occurs when workers must go into a city clinic either for personal attention or treatment of sick children. Migrants sometimes have difficulty in locating medical services suitable for their needs as they are unfamilar with the area.

A health unit staffed by a registered nurse and at least one doctor who can conduct weekly clinics and who can be called for emergencies should be available in large camps.

Strict rules of sanitation should be enforced. Various aspects of sanitation have been previously discussed in context with specific components of the camp and construction tehniques. A suggested floor plan for a health clinic is shown in figure 42.

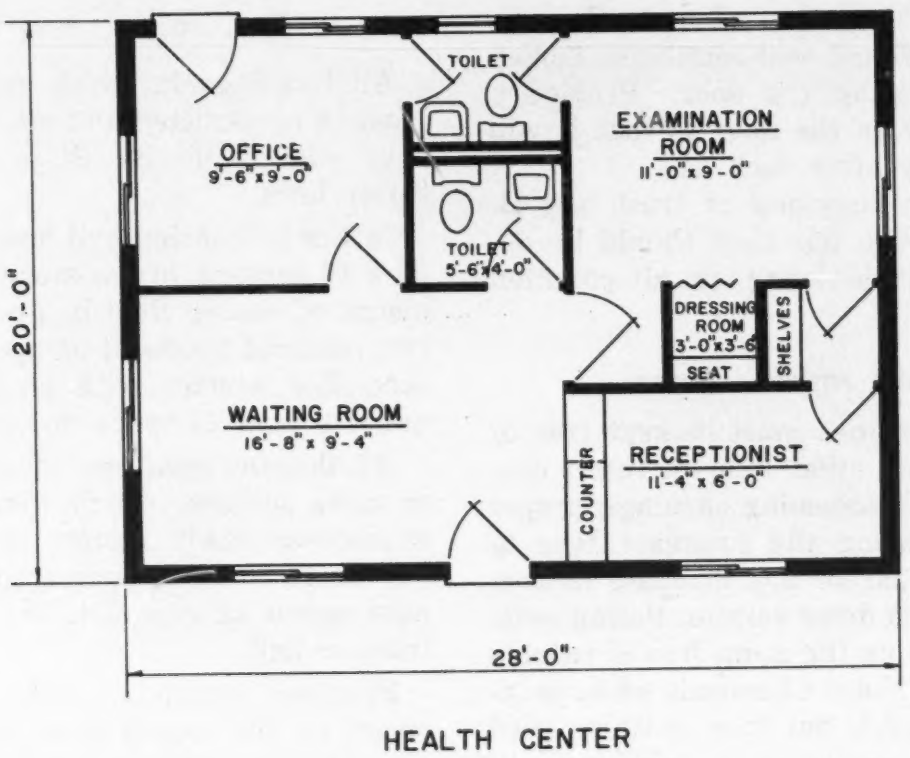


FIGURE 42.—Suggested floor plan of a health clinic for a large migrant-labor camp or a central clinic.

Child care centers

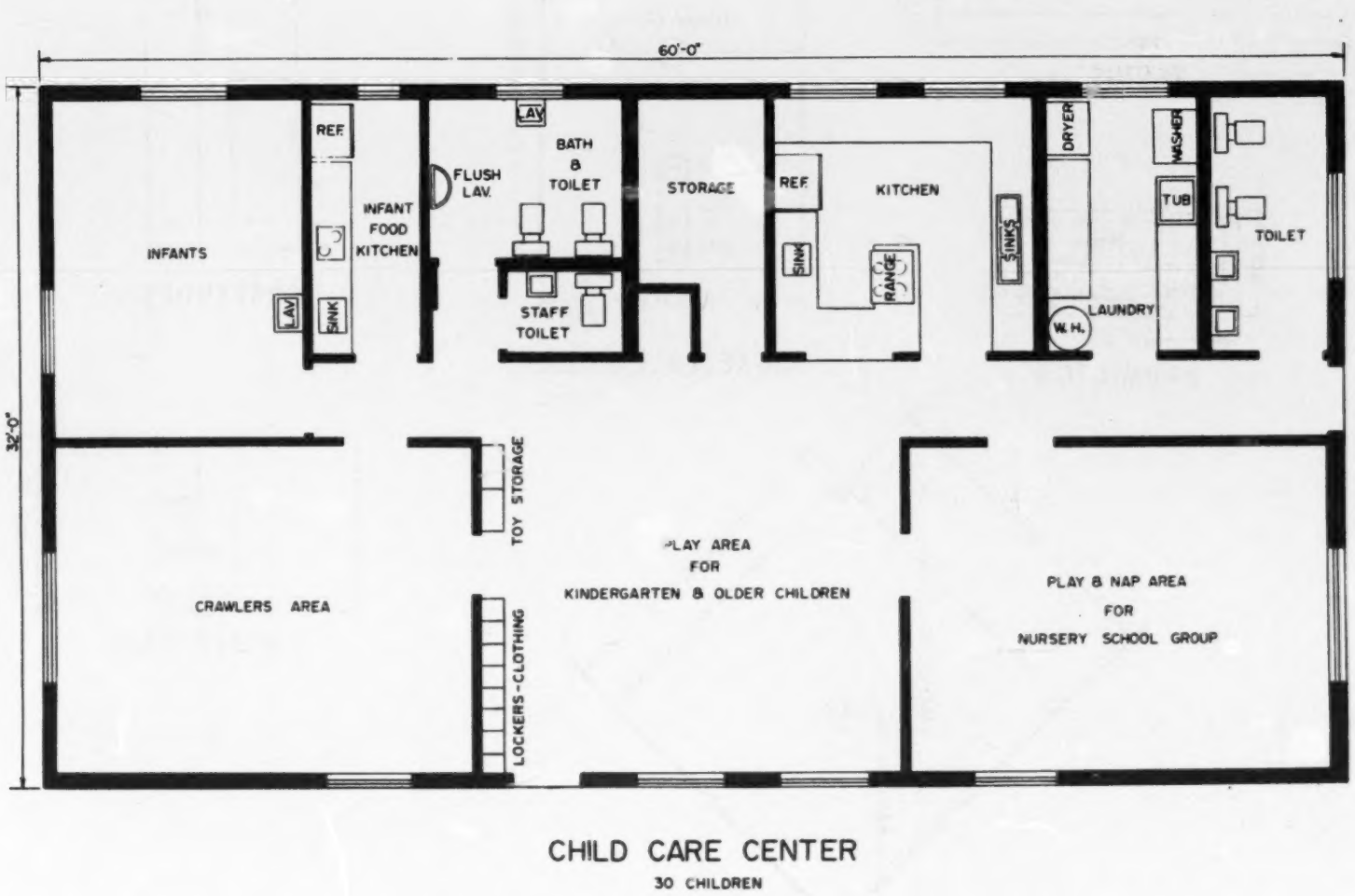
Child care centers free mothers to work with their husbands in the fields. The centers provide supervised activity and safety for the children while the parents work.

These centers can generally be justified only in larger camps or in a central area among a number of camps and located where transportation from them to a center is feasible. Supervisors and workers for such centers are sometimes enlisted on a volunteer basis and the cost borne by nonprofit associations or community organizations. In some instances, grants are available through Federal or State programs.

The design of such centers varies widely. The floor plan of a center designed to provide essential services for children of several ages is shown in figure 43. Many factors, such as the number and ages of children requiring care, how long they will stay, the resources, funds, and workers available for operating the center, and the desires of the migrants, should be considered when a center is designed.

Recreation

Recreation facilities are worthwhile investments in relieving job monotony, reducing tension, and keeping both children and adults healthfully occupied during free time. Such



CHILD CARE CENTER
30 CHILDREN

FIGURE 43.—Child care center designed to care for children of several ages.

facilities are added inducements for workers to return to the same camp year after year. They need not be expensive. Given permission, an area, and some inexpensive materials, the migrants themselves may be willing to develop some of the facilities.

A grassy shaded area immediately adjoining the camp and away from all vehicular traffic is the first essential requirement for young children's play. Sandboxes, swings, slides, and gymnastic bars are highly desirable.

A large grass area can be used for numerous games. Figure 44 shows dimensions for a softball field and courts for other sports. For large camps normally housing many young people, several recreation areas would be desirable.

Indoor space and equipment for table tennis, radio, television, cards, and reading should be provided for entertainment in bad weather. A standard table is 5 by 8 feet and 6 or 7 feet of space should be allowed at the ends of the table and 3 or 4 feet on the sides.

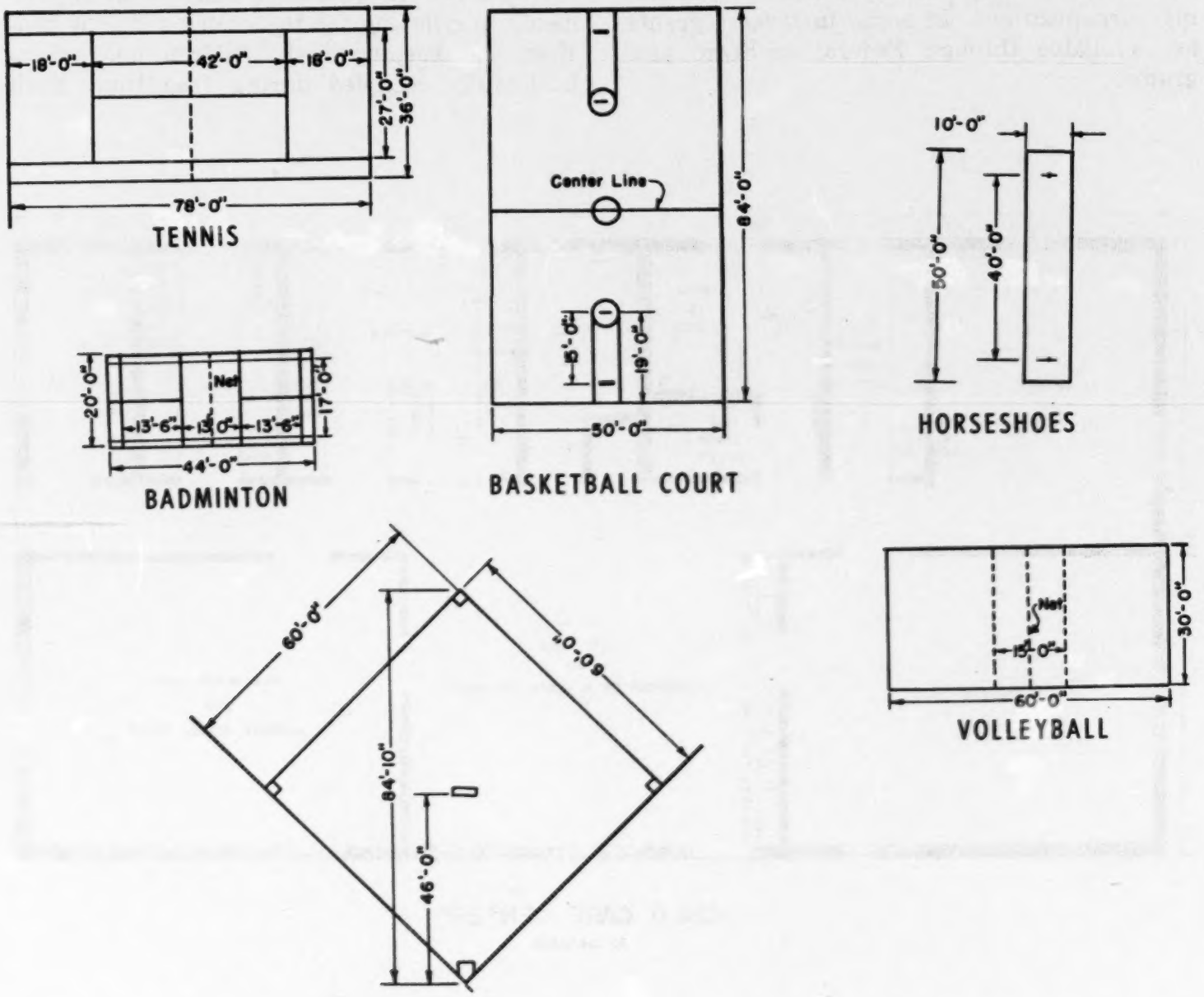


FIGURE 44.—Required spaces for various sports.

Landscaping

General landscaping such as trees, shrubs, grass, gravel roads, and parking areas will help to keep the campsite cool and clean. These extra features, relatively inexpensive, should give the migrant workers some pride and provide them with a reason for helping to maintain the good appearance of the camp. Trees on the west side of the camp will protect the buildings from the direct rays of the afternoon sun; this will keep the buildings cooler for comfortable occupancy during sleeping hours. However, large shrubs or trees should not be placed so close to individual buildings that they block the prevailing breezes.

Figures 45 and 46 illustrate the more pleasing appearance of migrant-labor quarters resulting from even a minimum amount of landscaping.

Camp layout and roads

The manner in which the foregoing elements are organized into a camp layout has a significant effect on the success of the overall project. Economy of operation, economy of construction, worker satisfaction, and community acceptance are involved.

The buildings on the site should not be crowded together. A minimum of 20 feet between living units and other buildings in the camp is recommended. Local health and sanitary codes must be observed. Avoid locating near sources of undesirable odors, dust, noise, or health hazards. Livestock pens, waste-disposal lagoons, and stagnant waters are potential sources of such problems. Suggested camp layouts are shown in figures 47, 48, and 49.

The road for entering or leaving the camp area and connecting with a main-traffic artery should be plainly marked. Drivers should be able to see clearly in both directions; thereby, the possibility of accidents will be reduced. One-way roads around the perimeter of the camp and to the various camp buildings are best. Blacktop or oiled-surface roads will reduce the dust problem. Sharp dips, bumps, and curves constructed in the roadway will help reduce the possibility of speeding or racing. Stop signs could be located at strategic points, such as pedestrian crossings.

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FIGURE 45.—Inexpensive landscaping improves the appearance of this migrant-labor housing. The simple fence outlines the parking area and keeps cars away from the building.

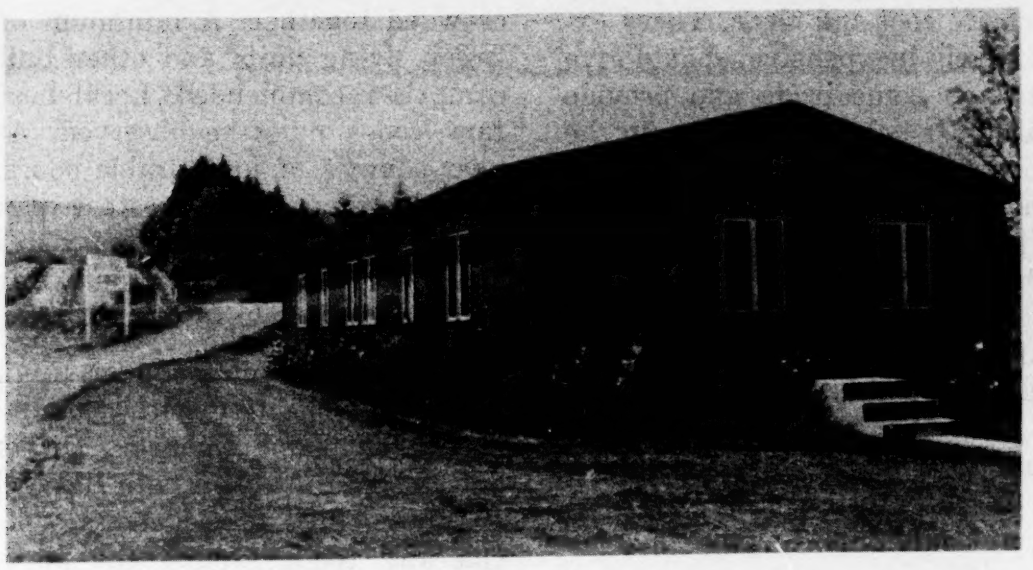

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FIGURE 46.—Simple landscaping gives this migrant-labor housing a pleasant appearance.

Adequate parking areas, off the access road or roads, should be provided and should be near the living quarters but as far away as possible from any play areas. A service roadway for use in delivering food and supplies to the camp kitchen should be provided.

Building trailer parks in towns and cities on the migratory routes has been proposed in one area of the West. Water and toilet connections and recreation facilities will be needed. The development of such parks will be primarily municipal undertakings planned to attract good workers.

Management

Good management is the best assurance for the proper maintenance of a migrant-labor camp.

All migrant camps that house 50 or more persons should have a responsible resident supervisor. Camps occupied by six or more persons should be supervised and inspected regularly by the camp operator or a responsible employee designated as supervisor. This supervisor should be available when needed and should be jointly responsible with the camp operator for the sanitary conditions and order of the camp.

The duties of an operator (or a competent person appointed as supervisor) vary, but they should include the following for efficient management.

1. Have housing ready for the workers when they arrive. Workers often resent waiting for the units to be cleaned or equipment to be moved in. A delay in being able to unpack might mean the loss of a half day of work.

2. Make daily inspections of the grounds and all community-type facilities to see that all are maintained in a clean and orderly condition and that all fixtures and structures are kept in good repair. Weekly inspections should be made of the separate family units and all other sleeping, cooking, and eating areas to ascertain if the tenants are complying with the regulations set forth by the camp management for cleanliness and neatness.

3. Be responsible for compliance with all Federal and State regulations pertaining to

migrant-labor camps and to all conditions stated on the worker's camp permit.

4. See that there are arrangements for adequate medical and nursing care in the camp or elsewhere.

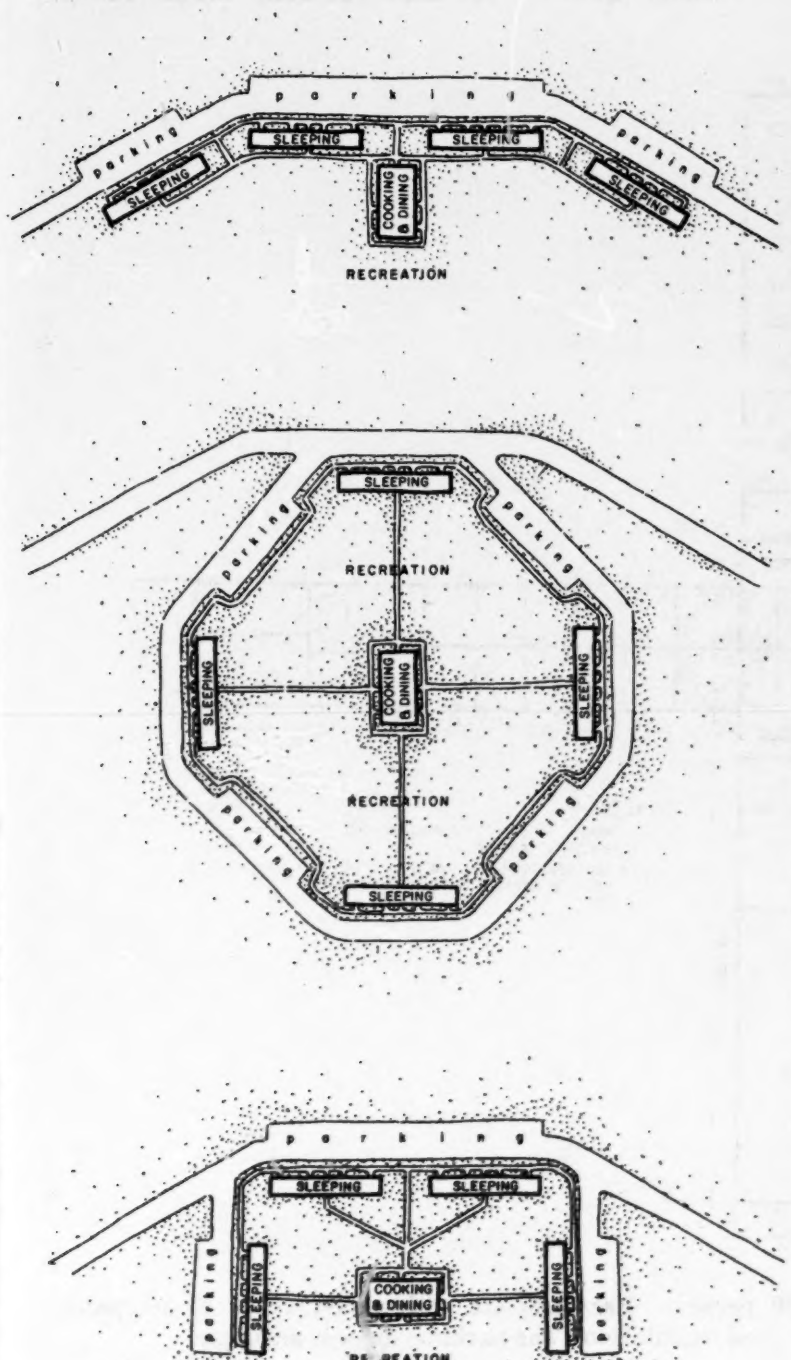


FIGURE 47.—Camp layout for housing 96 persons. Sleeping units include toilet and bath facilities, but workers are fed in a central dining room. A large recreation area and adequate parking space are provided.

5. Maintain adequate recreational facilities for the occupants of the camp.

6. Provide safety features to minimize accident and fire hazards. Keep the occupants informed of the fire and safety regulations of the camp and instruct them in the use of the equipment.

7. Have set rules and regulations regarding the responsibilities of the occupants. Reach a definite understanding with the workers before they move in. The agreement should be clear so that the workers may know exactly what is expected of them and what they may expect in return. It should include an explanation of wages—the rate of pay and when they will be paid; the housing and furnishings to be supplied by the owner, and what the workers are expected to supply; and rules regarding camp maintenance, cleanliness, order, and conduct. Post rules, in English and in any language commonly used by the workers, in conspicuous places in the camp where they may be easily read by all occupants.

8. The camp operator is responsible for the repair and maintenance of equipment furnished to occupants. A checklist of the equipment made on the arrival of the occupant and checked off when he leaves will help protect the interests of both parties.

Financing

In farming communities where several growers use migrant labor, it is usually more economical to form a group or an association of growers to build a central camp rather than to build and maintain several individual camps.

Check local lending agencies first for a loan for construction of the camp. If funds from this source are not available, the growers or association should contact the Farmers Home Administration. This agency makes insured loans to farm owners, farmers' associations, State and political subdivisions, and nonprofit organizations. It also makes grants to State and political subdivisions and to public bodies desiring to provide housing for migrant workers as a community service. These loans and grants may also be used to develop water,

sewage-disposal, heating, and lighting systems needed for the housing and other related facilities. The Office of Economic Opportunity also makes grants for sanitation, education, and day care for migrant farm workers and their families.

Investment and operation costs

Investment costs for a migrant-labor camp vary widely even in a limited area. The costs are influenced by many factors, such as land values, quality of construction, labor rates,

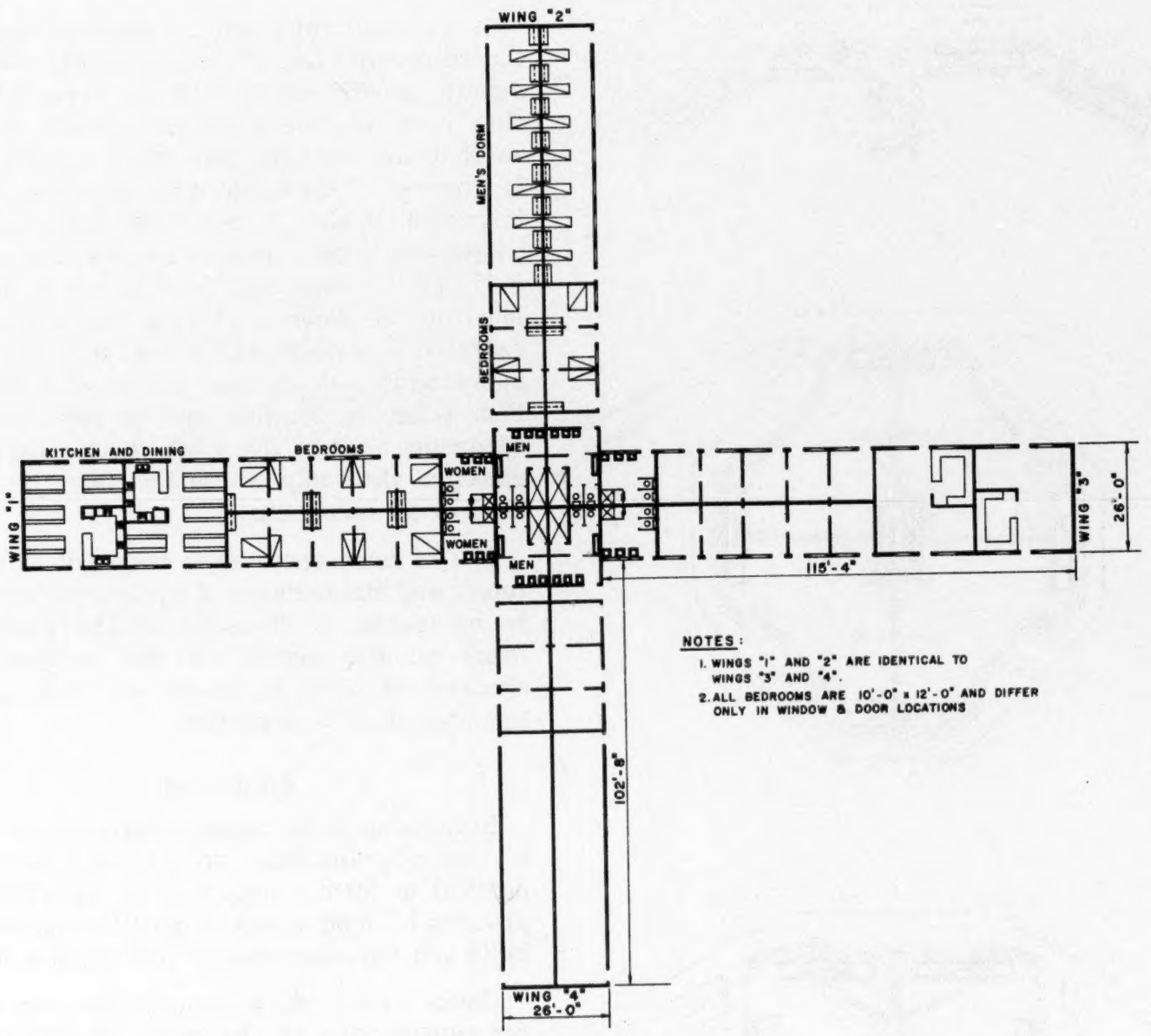
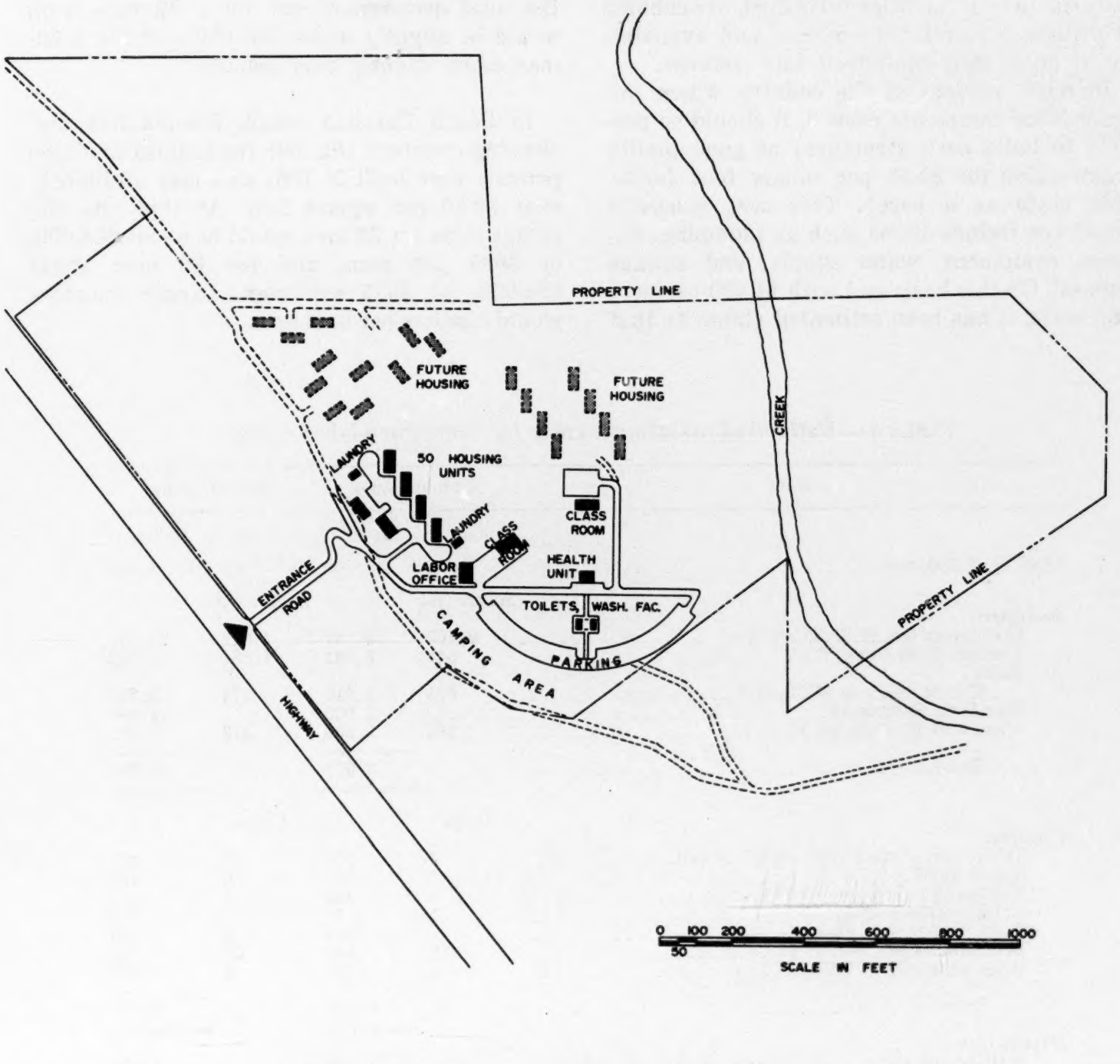


FIGURE 48.—Compact camp arrangement for housing 100 persons. Facilities are within easy reach of occupants, and sleeping quarters can receive reasonably good ventilation. The parking space is adequate.



SUGGESTED MIGRANT HOUSING DEVELOPMENT

FIGURE 49.—Camp layout for housing 50 families with adequate space for future additions. A health unit, adult classroom, child-care center, and labor office are included. Toilet, washup, and parking facilities near the camp entrance permit newly arrived migrants to rest until housing quarters are assigned.

material prices, facilities furnished, availability of utilities and related services, and availability of good used equipment and fixtures.

In most sections of the country where migrant-labor camps are needed, it should be possible to build such structures of good-quality construction for $5.50 per square foot (using 1968 costs as a base). This cost generally would not include items such as plumbing, fixtures, equipment, water supply, and sewage disposal. On this basis and with $1,000-per-acre land costs, it has been estimated (table 4) that the total investment cost for a 32-man camp would be slightly under $30,000 and for a 60-man camp slightly over $50,000.

In South Carolina small, low-maintenance, sleeping quarters (fig. 50) for couples or single persons were built in 1967 at a cost of slightly over $3.50 per square foot. At this rate the camps costs for 32 men would be about $22,000, or $685 per man, and for 60 men about $38,000, or $635 per man. Larger quarters would cost less per unit area.

TABLE 4.—*Estimated investment costs for migratory-labor camps*[1]

Item	32-man camp		60-man camp	
	Acres	*Dollars*	*Acres*	*Dollars*
Land @ $1,000/acre	2	2,000	3	3,000
	Square feet		*Square feet*	
Facilities:				
Living quarters @ $5.50/sq. ft	2,463	13,547	4,612	25,366
Kitchen @ $5.50/sq. ft	642	3,531	1,284	7,062
Bath:				
Construction @ $5.50/sq. ft	675	3,713	974	5,357
Plumbing, fixtures, etc		2,000		4,000
Wash area @ $1.00/sq. ft	260	260	312	312
Total		23,051		42,097
	Units		*Units*	
Fixtures:				
Tables and stools (8-seat units) @ $40	5	200	10	400
Stoves @ $75	3	225	6	450
Heaters (½ of rooms) @ $25	8	200	15	375
Refrigerators @ $75	1	75	2	150
Sinks, counters, shelves, etc. @ $100	1	100	2	200
Beds, mattresses, etc. @ $25	32	800	60	1,500
Wash tubs, etc. @ $150	1	150	2	300
Total		1,750		3,375
Miscellaneous:				
Well, pump, etc		1,500		1,500
Septic tank		400		700
Excavation		250		500
Tile		200		400
Tile to tank		125		125
Total		2,475		3,225
Total:				
Land		2,000		3,000
Facilities		23,051		42,097
Fixtures		1,750		3,375
Miscellaneous		2,475		3,225
Grand total		29,276		51,697
Investment per worker		915		860

[1] Developed by the Agricultural Economics Department, Virginia Polytechnic Institute, 1968.

In Oregon a survey made in 1962 indicated that in four counties the on-farm camp costs ranged from an average of $277 to $920 per unit. Central camps in three counties ranged from about $350 to $780 per unit. The on-farm camps ranged in age from 6 to 27 years and the central camps from 4 to 17 years so that current replacement costs would be much higher for the central camps.

Annual operating costs depend upon the section of the country and numerous other factors. According to an estimate made in 1968 by the Virginia Polytechnic Institute, the operating budget for a 32-man camp would amount to about $5,200, or $164 per worker, and for a 60-man camp about $8,400, or $140 per worker. Detailed estimated costs are given in table 5.

TABLE 5.—*Estimated operation budgets for migratory-labor camps*[1]

Item	32-man camp	60-man camp
	Dollars	*Dollars*
Insurance	300	500
Maintenance and repairs	1,000	1,500
Taxes	650	900
Interest @ 6 percent	885	1,550
Depreciation @ 5 percent	1,375	2,425
Laundry and fumigation	125	200
Utilities	400	700
Miscellaneous	500	600
Total	5,235	8,375
Cost per worker	164	140

[1] Developed by the Agricultural Economics Department, Virginia Polytechnic Institute 1968.

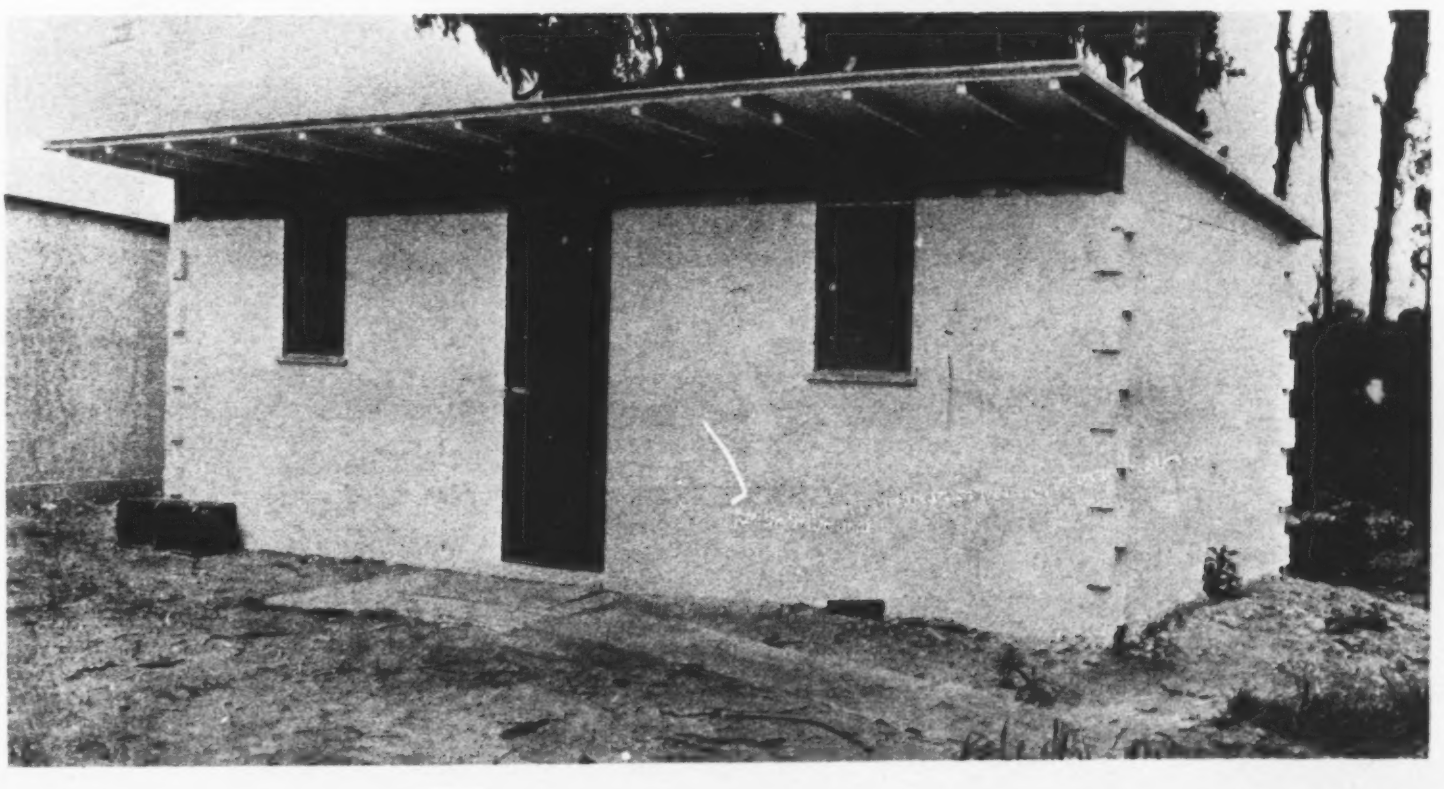


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FIGURE 50.—Migrant-labor sleeping quarters for two couples or four single persons each, built of concrete block in 1967 at cost of $3.50 per square foot of floor area (exclusive of furnishings).

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